IRON TRADE REVIEW
Registration Applied For
. The Authority of Industry National and International
Vol. LXXII Cleveland, June 7, 1923 No. 23

Production Again Breaks Record

May Performance of Blast Furnaces and Mills Is Greatest in History—Hot Weather Now Affecting Operations—New Business Shows Moderate Increase as Confidence Returns—Pig Iron Prices Work Lower

ANOTHER phenomenal record of pig iron production in May has furnished an additional measure of the tremendous consumptive demand for iron and steel that now prevails. The May figures for coke iron registered a new high mark for the country totaling 3,866,386 tons gross and 124,722 tons daily average or at the annual rate of over 45,500,000 tons. This exceeds the previous high record established in April when the total production was 3,546,308 tons and the daily average 118,210 tons. During May the active furnace list was increased by a net gain of 10 and on the final day stood at 321. Steel works and mill operations in May also were on a record-breaking scale.

This high speed production rate, to all indications, has reached its peak, at least for several months. Hot weather conditions this week have begun to cut down sheet and tin plate mill operations and a loss of approximately 10 per cent is reported from the Mahoning valley from this cause. Blast furnace performances are likely to be similarly affected. A number of the sheet plants in the Youngstown district plan to shut down the first week in July for repairs and will be down for several weeks.

More Buying of Steel

Following the better sentiment of the past week or two, buyers exhibit more confidence in conditions and new business in steel has shown some increase. This is especially true in bars, shapes and plates. Eastern plate mills especially have done well the past week. Although large producers shipped the greatest tonnage of tin plate in history, this year to date, manufacturers of containers have not been able to secure enough material to satisfy their requirements and are in the market for considerable quantities. A large automobile interest in Detroit is about to place its sheet needs for third quarter. Steel prices are well maintained on the minimum basis recently prevailing with the premium mills gradually coming down to that level.

Structural steel awards at 10,275 tons are a little heavier this week due mainly to the award of 6200 tons of New York subway construction with a similar contract of that size now up for bids. New oil tank work placed at Pittsburgh totals about 6000 tons.

Big Projects in Sight

Despite the absence of large new requirements being definitely placed at present, heavy tonnages are represented by undertakings either actually under negotiation or in sight. New school work planned in New York totals 80,000 tons in addition to a considerable amount of other public projects. Cleveland is going ahead with the award of 20,000 tons of pipe for waterworks extensions. Five oil and gas line inquiries tentatively before the mills include one for 225 to 450 miles of 16-inch and another of 50 to 100 miles of 10-inch. An inquiry for three freight vessels requiring 10,000 tons is up from a lake shipyard.

Further softness in pig iron and semifinished material has forced another decline to $46.79 in IRON TRADE REVIEW composite this week. This represents the fourth consecutive weekly decline.

Some possibility of renewed selling of foreign pig iron to the United States has been opened by the quotations of $25, continental ports, on foundry iron by French and Belgian producers, though the decline in the domestic market tends to offset this. Imports of foreign iron to this country in March against orders placed several months ago rose to 72,344 tons, making the total for the year to date 192,072 tons. Pig iron constituted two-thirds of the iron and steel imports in March which were increased 38,368 tons over February.

Pig Iron Is Awakening

Pig iron shows more signs of renewed life but buyers still are cautious, some of them closing only through July. At Philadelphia the market is the most active in several months. One user closed for 20,000 tons of basic at something more than $2 below the previous quotation. Several thousand tons of foundry iron has been sold at a similar reduction. At Cleveland new inquiry totals 15,000 to 20,000 tons and the Chicago market has broadened considerably. A 2500-ton sale has definitely fixed the valley basic market at $27.50. Southern iron still holds at $27, Birmingham.

Business Trend and Chart Section Page 1665

Pig Iron Market Is Broadening

New Inquiry and Sales Appear in Several Districts—Cleveland Inquiring for 15,000 to 20,000 Tons—Eastern Market Is Lowest—Valley Basic Market Clarified by Sale at $27.50—Southern Holds at $27

PITTSBURGH, June 5.—While one sale of 2500 tons of basic has been recorded, continued quietness marks the pig iron market with buyers holding up third quarter buying presumably in an effort to obtain still lower prices. That acting prices have yielded to this influence cannot be questioned and levels this week generally are 50 cents per ton under those prevailing one week ago. One tonnage sale of basic is reported at $26.50, valley but this is understood to be resale iron disposed of by a scrap interest and does not reflect the actual market condition. Some other resale iron was moved at $27, valley. The 2500-ton sale was made at $27.50, valley, to a Butler, Pa. consumer for shipment during June and clarifies the basic price situation. One nearby buyer of basic has offered to pay $27.50 to a seller who has been quoting $28, valley, on a lot of 1000 tons or more. Bessemer is quoted at $29, the basis of several recent sales involving small tonnages. No large inquiries now are current and consumers of this grade are buying in lots of 50 to 100 tons at a time. Average sales prices on basic and bessemer in the valley during May as compiled by W. P. Snyder & Co. were $28.056 and $30.10 respectively as compared with $31, the average on both grades in April. Declines of $2.944 and 90 cents respectively were recorded in this average during May. The April averages of $31 were larger than those of March by 98 and 74 cents respectively, basic sales for March averaging $30.02 and bessemer for the same month $30.26. From $28.50 to $29 represents today's market on No. 2 foundry, a decline of 50 cents from a week ago. As yet, however, no buying of size has developed. Gray forge is quoted at $28 to $28.50, valley, a decline of 50 cents, but malleable is unchanged at $29 to $29.50, valley. No interest is manifested in either grade except that a consumer in the West has asked for prices on 500 tons of malleable. Small lots of 50 to 100 tons are noted in connection with low phosphorus copper-free iron which remains the same as for several weeks past, $36, valley. The Bethlehem Steel Co. is quoting $28.50 on basic and No. 2 foundry and $29.50 on bessemer.

Pennsylvania Makers Seek Orders

Boston, June 5.—After nearly a month of waiting eastern Pennsylvania furnaces have reduced their price of $31 at the furnace for 1.75 to 2.25 silicon pig iron, and are now active for business on lower levels. Despite this orders continue small, and buying throughout the whole New England district during the past week probably has been under 3000 tons. The largest order reported is for 400 tons for a Massachusetts consumer. A Connecticut foundry took 300 tons of No. 2X eastern Pennsylvania iron at $30, furnace, or $33.66 delivered. Some small sales below this price have been reported and at least one eastern Pennsylvania furnace is on a $29.50 base. Central Pennsylvania furnaces with a freight rate approximately equaling that from Buffalo have been quoting $28.50, furnace, for the base grade and unconfirmed rumors of $28, furnace, are circulating. Most Buffalo furnaces hold to a $29.50 base, but No. 2X iron is entered at this same price, and it is doubtful if any of the Buffalo interests would allow attractive business at $29 to get away from them. A Rhode Island consumer took about 200 tons to round out a larger order placed the previous week. Foundry activity continues high and close market observers are at a loss to explain the long continued absence of buying. With third quarter scarcely more than three weeks away and about 50,000 tons of pig iron still to be sold in New England for delivery during July, August and September, a buying movement is expected soon. Birmingham and Virginia prices remain unchanged. Inquiry is for car lots only with one or two exceptions. A Connecticut foundry is in the market for 500 tons.

Quotes $29 Price

Buffalo, June 5.—The $29 base price on pig iron has definitely appeared and is being quoted on carload quantities for prompt delivery by one maker. The price for No. 2X (2.25 to 2.75 silicon) is $29.50 and for No. 1X (2.75 to 3.25 silicon) is $30. This maker has sold a few carloads. Other makers have not reduced their prices in conformity and profess to be still holding to the $29.50 base. Inquiry is limited to a few thousand tons of small lots and sales are light. The market gives indications of picking up in the near future.

Week's Sales 5000 Tons

New York, June 5.—Pig iron purchases in this district during the past week aggregated less than 5000 tons. There is a fair amount of inquiry for prompt and nearby requirements but third quarter business has not yet started. The major market development during the past week was a $2 decline in prices on eastern Pennsylvania foundry iron. The eastern Pennsylvania and New Jersey foundry market now may be quoted at $29, base furnace, plus $1 silicon differentials. Central Pennsylvania foundry now may be had at $28, base furnace, plus 50-cent silicon differentials, and lower possibly might be done. The Buffalo market now is $29, base furnace, plus 50-cent silicon differentials. The American Hardware Co. during the past week bought 800 tons of 2.75 to 3.25 silicon iron for shipment up to Sept. 1. The Crane Co., Bridgeport, has not yet closed on an inquiry for malleable iron. The Gould Coupler Co. has not yet closed on an inquiry for 1000 tons of malleable. The American Car & Foundry Co. placed approximately 1000 tons of foundry, mostly resale iron. Moore Bros., Elizabeth, N. J. placed a small tonnage of bessemer. The Worthington Pump & Machinery Corp. placed 500 tons of charcoal iron. The Ingersoll-Rand Co. placed 300 tons of malleable. In addition, a lot of 1000 tons, another of 600 tons and two lots of 100 tons each of foundry iron have been placed during the past week. The leading inquiry now before the trade involves 600 tons of 2.25 to 2.75 silicon iron for the Elkhart, Ind. shops of the New York Central railroad, and 200 tons of 2.75 to 3.25 silicon and 225 tons of 2.25 to 2.75 silicon for the Frankford, N. Y., shops.

More Interest in Market

Cleveland, June 5.—A larger volume of inquiry and sales in the northern Ohio pig iron market leads some furnace interests to believe that this is the beginning, in a moderate way, of large buying for the third quarter. New inquiries involve 15,000 to 20,000 tons of iron, including 7500 tons of basic, and sales in the week aggregate 8000 to 10,000 tons of foundry iron. One of the lake furnace interests closed for 4000 tons; a large merchant interest made a half dozen sales of lots ranging from 500 to 900 tons, while other sellers with headquarters here also took small tonnages. The Port Huron, Mich., inquiry for 4000 tons of foundry iron reported last week has not been closed. Negotiations were still in progress over the 1500 tons of malleable iron for which a Columbus, O., user was inquiring last week. The International Harvester Co. has placed 500 tons for its Springfield, O., works, and several Cleveland concerns have purchased small tonnages. Among new inquiries referred to is one for 5000 tons of basic iron, one for 2500 tons of basic, and another for 2000 tons of foundry iron. Certain foundries have put off until July iron due them in June, giving shortage of labor and other reasons as the cause, though it is noted that the iron was purchased at higher prices than the same buyers would be called on to pay today for material for July delivery. Some adjustments may be made on the new price basis. The postponement of shipments has made available iron from some sources that were booked almost to the limit, and good sales have been made on this account. A buyer in the market for a round tonnage of foundry iron has informed sellers that they would have to go as low as $29 valley, to receive consideration. Among the half dozen sales already referred to were some at $30, valley. A buyer of basic tells furnace interests that it considers $27, valley, as a fair price, while they have considered $29 as their minimum. Eastern iron is being shipped into Cleveland on a basis of $29, Buffalo, bringing the delivered price to $31.65. A good tonnage of high silicon iron from an eastern furnace was sold here in the week, the delivered price being $35.50. A

Cleveland furnace still maintains a nominal price of $32, furnace, for local delivery. The lake furnace price, outlying, is $31 to $31.50. A few hundred tons of standard low-phosphorus iron has been sold in this district at $36, base furnace. It is apparent that more negotiations for iron are under way between buyers and sellers than at any time since the beginning of the dull period.

Buyers Still Waiting

St. Louis, June 4.—The disposition among buyers and sellers of pig iron at the moment is to await developments, and the market is without features of interest or importance. Users apparently are determined to get their third quarter supplies below present quotations, and contracting continues at a minimum. The furnaces, on the other hand, are in a comfortable position and can hold out for some time. Meanwhile the melt continues heavy, though somewhat under the recent peak levels, and stocks in the hands of mills and foundries are at a low ebb. If the present rate of consumption continues some purchasing will be necessary in the near future. With the present rate of iron production, melters say, there is no reason for apprehension relative to getting tonnage when they need it. Recent heavy shipments have placed melters in better position relative to immediate supplies. The steel plants are working at or near capacity, and are in more urgent need of material than the gray iron users. Some small resale tonnages have appeared within the past 10 days, but these are not heavy enough to affect the situation. Generally, however, prices are easier, and there are reports of Chicago makers shading the $32 quotation in this territory. Southern iron is quoted at $27 to $28, but only one interest is holding to the higher figure. Sales reported include 200 tons of foundry to a Quincy, Ill., melter for third quarter; 400 tons to a Davenport, Ia., user; 500 tons of malleable to a Peoria interest and carloads aggregating approximately 450 tons. An Iowa interest is inquiring for two cars. The leading local producer continues to quote $33 to $34, f. o. b. Granite City. This interest is offering iron for third and fourth quarter. Two southern furnaces which were recently out of the market have come in and are offering round tonnages for the remainder of the year.

Southern Market Still Firm

Birmingham, Ala., June 4.—No apprehension is expressed by southern furnace interests as to general market conditions, and it is denied that sales have been made in this territory under $27 base for No. 2 foundry iron. The belief is that a few resale lots at $26 and some sales of off-grade iron at $25 have been misinterpreted. While numerous small sales are being made, the buying movement has not started. Inquiries are steady for iron for the third quarter but the smaller companies in the district are unable to take on much iron. The larger companies can handle the business. A few sales are reported for the fourth quarter. No decrease is noted in the production in this district. The Sloss-Sheffield Steel & Iron Co. still is shipping in quantity on the Tennessee river into the St. Louis and Chicago territories, via Metropolis, Ill., and thence by rail. A large tonnage is yet to be delivered into that territory. The smaller melters of pig iron in the South and Middle West, always

(*Concluded on Page* 1644)

Waiting for Lower Coke

Furnaces Refuse To Contract for Third Quarter at $5.75 to $6—Market Is Easier—Foundries Buying Spasmodically

COKE PRICES, PAGE 1645

Pittsburgh, June 5.—With quotations of $5.75 and $6 on their requirements of beehive furnace coke, blast furnace operators not yet protected on tonnage for the third quarter are planning to hold out for still lower figures. The $5.75 figure was reached by successive declines in quotations by one or two interests starting at $6, going to $5.90, then to $5.85 and finally to $5.75. Consumers now think that unless they can contract at below $5.75 they will obtain their coke in the spot market. Some coke producers still maintain the $6 level, although lately the majority of contracts have been recorded at less. The Eastern Steel Co. is in the market for 26,000 tons. A Philadelphia broker is obtaining figures on 10,000 tons, and two shipments to a blast furnace operator. The Robesonia Iron Co. wants 6000 tons monthly for the third quarter and several others, such as M. A. Hanna & Co., still are negotiating for larger tonnages. One or two interests which closed on a portion of their requirements at the $6 price, such as the Shenango Furnace Co., continue to postpone closing on the remainder of their needs. The contract market is quoted at $5.75 to $6. Two or three inquiries are out for spot tonnages involving 50 carloads each. A southern furnace company bought one block of 15 carloads for filling in purposes before deliveries on its $6 contract are commenced. A prominent local independent steel corporation paid $5, ovens, per ton on 100 carloads of the standard furnace grade. If some operators will not sell for prompt delivery at below $5.25 the spot mraket is quotable at $5 to $5.25. The sale of 6000 tons of medium sulphur coke to the British American Nickel Co. is noted at $3.50, ovens. The coke trade anticipates much higher prices by August due to labor and car shortages which are expected to develop. Buying of small lots of foundry coke continues spasmodically. Production of this grade is growing owing to the cutting down of a number of oven charges per week to limit the output of the furnace grade. Prices on standard foundry coke run from $5.50 to $6.50, ovens, although some contracts are being worked out this month on the basis of $6.75 and $7. A few at these levels extend through the third quarter. Production, according to the *Connellsville Courier*, for the week ended May 26 was 295,670 tons compared with 298,430 tons in the preceding week.

Demands Quiet

St. Louis, June 4.—By-product coke manufacturers report excellent contracting, with a number of their customers placing larger orders than last season. Water gas interests have bought heavily, and other public utilities are active. Demand for the second half for melters is quiet, with offerings from all fields fairly liberal. On standard foundry coke quotations range from $6 to $6.50 Connellsville. Stocks generally in this district are ample for all requirements during the next few weeks, and users are disposed to hold off filling their requirements. Some southern coke has been offered at slight concessions under recent quotations.

By-Products Prices Drop

Boston, June 5.—Lack of demand for foundry coke and low prices offered by dealers handling the Connellsville product have resulted in the local by-product producers reducing their quotation from $15 to $14, delivered to foundries in this district.

Foundry Coke Easier

New York, June 5.—Prices on spot standard foundry coke again have been lowered and now range from $5.50 to $6.50, Connellsville, depending on the brand. In addition, one interest which was quoting $8, Connellsville, on second half foundry coke has reduced its contract price to $7.50. While spot demand is fair, there is very little contracting. The Seaboard By-Products Coke Co. also has joined the downward movement and now is quoting $11.84 to $11.91, delivered at Newark.

Southern Market Steady

Birmingham, Ala., June 4.—The coke market in the Birmingham district is firm, and consumption in this district shows no abatement. New buying is not as brisk as it was a few weeks ago, but there is no decrease in shipments. Some difficulty is being experienced in production because of the labor shortage. Some makers of 72-hour coke are just able to produce sufficient coke to meet demands. Except for the coke belonging to the Sloss-Sheffield Steel & Iron Co. there is not much coke on yards in this district. Quotations range between $8.50 and $9 to $9.50 for by-product and beehive foundry coke. Furnace coke is about $1 less. A little spot foundry coke has been sold at $9.50 and $10. Lack of demand for steam coal has caused production to drop to 366,000 tons per week in this state.

By-Product Coke Lower

Cincinnati, June 5.—The coke market here lacks strength, although inquiries for the last half are numerous. Producers quoting on this business are asking 50 to 75 cents a ton above the prevailing market quotations. Most operators are unwilling to quote beyond Oct. 1. It is apparent that specifications on coke contracts this month will not be as heavy as anticipated in view of the approaching inventory next month. Demand for foundry coke is a feature of the market. Connellsville operators continue to bank ovens because of unsatisfactory market conditions. Spot Connellsville foundry coke was sold during the past week at $5, ovens, while numerous small orders for Wise county foundry were accepted at $8, ovens. The price on Indianapolis by-product coke has been reduced 50 cents a ton, making the prevailing market quotation, $14.40, delivered. This is the first reduction in the Indianapolis price since the first of the year. New River ovens are concentrating their efforts on the manufacture of foundry fuel. A user in southern Illinois is in the market for 50 cars of foundry coke for shipment during the next 60 days.

Pig Iron Market Broader

(*Continued from Page* 1643)

buying from the Birmingham furnace interests, appear to be taking on a little stock. Two furnaces are making charcoal iron for which there is a fair demand, the quotation still being $34 per ton.

Buying in Small Spot Lots

Cincinnati, O., June 5.—Pig Iron buying in small lots, ranging from carloads to 250 tons is the feature of the local market. Interest in third quarter and last half is lacking, while spot buying is in considerable volume and on the increase. During the past week orders were received from consumers who permitted their stocks to run low. Sales specify prompt delivery or within the next 30 or 60 days. The Lunkenheimer Co., Cincinnati, bought 150 tons of northern foundry for June and July shipment at a price reported to be below $29, Ironton base. Sales of 100 tons of silvery iron to a central Ohio consumer and two carloads of Virginia iron for delivery this month also are noted. Two important inquiries are out for 1200 tons each. A Columbus O., melter wants 1200 tons of malleable for third quarter, while another central Ohio consumer is inquiring for 1200 tons of northern foundry for shipment this month and next. Another inquiry is for 300 tons of northern iron from a consumer in the northern part of Ohio. While there is some shading in prices among sellers, this practice is not general. Northern iron is quoted at $29 to $30, Ironton base, while the southern market is firm at $27, Birmingham base.

Eastern Business Better

Philadelphia, June 5.—The pig iron market here is more active than in two months. The principal development is the purchase by one eastern consumer of 20,000 tons of basic for July. This business averaged somewhat below $28.25, delivered. It was distributed among seven eastern furnaces and has given these producers a more comfortable feeling. At least 2000 tons of low phosphorus iron was sold, of which about 1500 tons was copper bearing iron at $33, furnace, and the remainder copper-free iron at $31, New York state furnace. Seaeral thousand tons of foundfy iron was sold. Foundry sales in this general territory in the past week are estimated in some quarters at 7000 tons. However, considerable of this tonnage went to furnaces outside the immediate eastern district. Better inquiry now is noted for foundry iron, but consumers generally are inquiring only for July rather than for the third quarter. All eastern furnaces have reduced foundry prices to $29, base furnace, plus $1 silicon differentials. Gray forge is nominal at $28 to $29, delivered. Malleable is nominal at $30, furnace. Central Pennsylvania foundry iron is $27.50 to $28, base furnace, plus 50-cent differentials. Virginia iron is $27 to $28, furnace, for No. 2 plain and $28 to $28.50 for No. 2X. The Robesonia furnace will be idle until September.

Inquiry and Sales Picking Up

Chicago, June 5.—Inquiry for and buying of third quarter pig iron are increasing gradually, as melters find their requirements larger than anticipated. The Chicago market is holding firm at $32, despite weakness in other centers. Deliveries are being urged, some being anticipated. One lot of 1000 tons for June was delivered in May and 1500 tons for July are being shipped in June. Inventory and a shortage of molders allow other tonnages to be held back. Inquiry from a Chicago melter for 2000 to 3000 tons of foundry iron for June is being considered. An Indiana melter wants 750 tons for third quarter. A Michigan melter who asked for 1000 tons of malleable iron for June bought 500. An Indiana user is asking for 300 tons of foundry iron for June. A northern Michigan melter closed part of a 500-ton inquiry for foundry iron for June and July. Southern iron is firm at $27, Birmingham. Occasionally resale iron is offered at $26. Superior charcoal iron is quiet. The sale of 500 tons to an eastern user is noted. There is not much demand for low-phosphorus iron offered at $38 delivered. A Milwaukee user is inquiring for 150 tons. The market for silveries is dull only spot cars selling. An inquiry is noted for 250 tons.

Prices Present and Past

Representative market figures yesterday, and for last month, three months ago and one year ago

	June 6, 1923	May 1923	Mar. 1923	June 1922
PIG IRON				
Bessemer, valley, del. Pitts.	$30.77	32.07	31.67	26.96
Basic, valley	27.50	29.80	29.80	25.00
*No. 2 foundry, del. Pittsburgh	30.27	31.91	31.37	25.96
*No. 2 foundry, Chicago	32.00	32.50	31.25	23.25
Lake Superior charcoal, Chicago	36.65	36.65	35.55	30.00
Malleable, valley	29.00	30.20	29.20	24.20
Malleable, Chicago	32.00	32.40	31.25	23.25
*Southern No. 2, Birmingham	27.00	27.00	26.50	18.50
*Southern Ohio, No. 2, Ironton	29.00	31.00	30.75	23.25
Basic eastern del., eastern Pa.	28.14	30.75	29.35	25.25
**No. 2X, Virginia furnace	28.00	28.60	28.25	24.50
**No. 2X, eastern del., Phila.	30.76	32.76	32.00	27.20
Gray forge, val. del. Pittsburgh	29.77	31.17	30.77	25.96
Ferromanganese, del. Pitts.	124.79	129.79	120.79	72.82
SEMIFINISHED MATERIAL				
Sheet bars, bessemer, Pittsburgh	44.00	45.40	44.50	35.00
Sheet bars, open-hearth, Pitts.	44.00	45.40	44.50	35.00
Billets, bessemer, Pittsburgh	44.00	45.00	44.50	35.00
Billets, open-hearth, Pittsburgh	44.00	45.00	44.50	35.00
FINISHED MATERIAL				
Steel bars, Pittsburgh	2.40	2.40	2.30	1.65
Steel bars, Chicago	2.50	2.50	2.34	1.75
Steel bars, Philadelphia	2.77	2.77	2.67	2.01

	June 6, 1923	May 1923	Mar. 1923	June 1922
FINISHED MATERIAL (Continued)				
Iron bars, Philadelphia	$2.77	2.82	2.70	1.96
Iron bars, Chicago mills	2.60	2.60	2.53	1.74
Beams, Pittsburgh	2.50	2.50	2.35	1.65
Beams, Philadelphia	2.82	2.87	2.77	2.01
Beams, Chicago	2.60	2.60	2.44	1.75
Tank plates, Pittsburgh	2.50	2.50	2.35	1.65
Tank plates, Philadelphia	2.87	2.92	2.77	2.01
Tank plates, Chicago	2.60	2.60	2.44	1.75
Sheets, blk., No. 28, Pittsburgh	3.85	3.85	3.55	3.15
Sheets, blue anl., No. 10, Pitts.	3.00	3.00	2.70	2.40
Sheets, galv., No. 28, Pittsburgh	5.00	5.00	4.65	4.15
Wire nails, Pittsburgh	3.00	3.00	2.90	2.40
COKE				
Connellsville furnace, ovens	5.00	5.10	7.15	6.60
Connellsville foundry, ovens	5.50	6.10	8.15	7.20
OLD MATERIAL				
Heavy melting steel, Pittsburgh	21.00	22.20	26.10	17.40
Heavy melting steel, eastern Pa.	19.50	20.40	24.85	15.30
Heavy melting steel, Chicago	18.50	19.75	23.15	14.45
No. 1 wrought, eastern Pa.	23.50	24.40	27.60	17.50
No. 1 wrought, Chicago	17.50	19.95	23.25	14.20
Rails for rolling, Chicago	20.00	21.80	24.90	15.40

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon

Composite Market Average

Representing the Combined Average Prices per Ton of Fourteen Leading Iron and Steel Products Yesterday, Oone Week, One Month, Three Months, One Year and Ten Years Ago

June 6, 1923	May 29, 1923	May, 1923	March, 1923	June, 1922	June, 1913
$46.79	$47.26	$47.52	$45.31	$36.96	$26.78

Products Included Are Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Structural Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe

Iron and Steel Prices

SCRAP PRICES, PAGE 1714, WAREHOUSE PAGE 1736, ORE, NUTS, BOLTS AND RIVETS AND PIPE PRICES, PAGE 1710

Pig Iron

Bessemer, valley	$29.00
Bessemer, Pittsburgh	30.77
Basic, valley	27.50
Basic, Pittsburgh	29.27
Basic, Buffalo	29.50
Basic, del., eastern Pa.	28.14 to 28.50
Malleable, valley	29.00 to 29.50
Malleable, Pittsburgh	30.77 to 31.27
Malleable, Chicago	32.00
Malleable, Buffalo	30.00
Malleable, del., eastern Pa.	31.00 to 31.50

FOUNDRY IRON SILICONS

No. 2 Northern	1.75 to 2.23
No. 2 Southern foundry	1.75 to 2.25
No. 2X East'n and Virginia	2.25 to 2.75
No. 1X Eastern	2.75 to 3.25
No. 1 Chicago	2.25 to 2.75
No. 2 foundry Eastern	1.75 to 2.25

No. 1X, eastern del., Phila.	31.76 to 32.13
No. 1X Buffalo	30.00 to 30.50
No. 2 foundry, valley	28.50 to 29.00
No. 2 foundry, Pittsburgh	30.27 to 30.77
No. 2 foundry, Buffalo	29.00 to 29.50
No. 2 foundry, Chicago	32.00
No. 2 foundry, Granite City	33.00 to 34.00
No. 2 foundry, Ironton fur.	29.00 to 30.00
No. 2 foundry, Cleveland del.	31.27 to 31.65
No. 2 foundry, del. Phila.	29.76 to 30.13
No. 2 foundry, N. J. tidewater	30.13 to 30.64
No. 2X, eastern del., Phila.	30.76 to 31.13
No. 2X, east. N. J., tidewater	31.13 to 31.64
No. 2X, eastern del. Boston	34.65 to 35.65
No. 2X foundry, Buffalo fur.	29.50 to 30.00
No. 2X, Buffalo, del. Boston	33.92 to 34.42
No. 2 southern, Birmingham	27.00
No. 2 southern, Cincinnati	31.05
No. 2 southern, Chicago	33.01
No. 2 southern, Philadelphia	33.80
No. 2 southern, Cleveland	33.01
No. 2 southern, Boston (rail and water)	33.41 to 33.91
No. 2 southern, St. Louis	32.17
No. 2X, Virginia furnace	28.00 to 28.50
No. 2X, Virginia, Phila.	33.27 to 33.57
No. 2X, Virginia, Jersey City	33.54 to 34.04
No. 2X, Virginia, Boston	33.92 to 34.42
Gray forge, eastern Pa.	28.00 to 29.00
Gray forge, val., del. Pitts.	29.77 to 30.27
Low phos., standard, valley	36.00
Low phos., standard, Phila.	35.79
Low phos., Lebanon furnace	33.00
Charcoal, Birmingham	34.00 to 35.00
Charcoal, Superior, Chicago	36.65

Silvery Iron

Jackson County, Ohio, furnace

8 to 9 per cent	$39.50
9 to 10 per cent	41.50
10 to 11 per cent	43.50
11 to 12 per cent	46.50
12 per cent	48.50
13 per cent	51.00

Bessemer Ferrosilicon

Jackson County, Ohio, furnace

10 to 11 per cent	$48.50
11 to 12 per cent	51.80

Ferroalloys

Ferromanganese 78 to 82 per cent, domestic, seaboard or furnace	$120.00 to $125.00
Ferromanganese, delivered, Pittsburgh	124.79 to 129.79
†Ferromanganese, 79 per cent English c.i.f. seaboard	125.00
Spiegeleisen 19 to 21 per cent furnace or tidewater, contract	45.00 to 47.50
Spiegeleisen 19 to 21 per cent furnace or tidewater, spot	50.00
Ferrosilicon, 50 per cent contract freight allowed	90.00 to 95.00
Ferrotungsten standard, per pound contained	92.50 to 97.50
Ferrochrome, 60 to 70 chromium, 4 to 6 carbon per pound contained, delivered	12.00
Imported ferrochrome, 4 to 6 per cent carbon	12.00
†Duty paid.	
Ferrovanadium, 30 to 40 per cent per pound estimated, according to analysis	$3.50 to $4.00
Ferro carbon-titanium, carloads, producer's plant, per net ton	$200.00

Coke

Beehive, Ovens

Connellsville furnace	$5.00 to 6.00
Connellsville foundry	5.50 to 6.50
New River furnace	9.50 to 10.00
New River foundry	12.50 to 13.00
Wise county furnace	6.25 to 6.75
Wise county foundry	8.00 to 8.50
Alabama furnace	7.50 to 8.00
Alabama foundry	8.50 to 9.00

By-Product

Foundry, Newark, N. J., del.	$11.84 to 11.91
Foundry, Chicago, ovens	15.00
Foundry, Boston, delivered	16.00
Foundry, Granite City, Ill.	14.00
Foundry, Alabama	8.50 to 9.00

Semifinished Material

BILLETS AND BLOOMS

4 x 4-inch base

Open-hearth, Pittsburgh	$42.50 to 45.00
Open-hearth, Youngstown	42.50 to 45.00
Open-hearth, Philadelphia	48.17
Bessemer, Pittsburgh	42.50 to 45.00
Bessemer, Youngstown	42.50 to 45.00
Forging, Pittsburgh	55.00
Forging, Philadelphia	56.17 to 59.17

SHEET BARS

Open-hearth, Pittsburgh	$45.00 to 47.50
Open-hearth, Youngstown	45.00 to 47.50
Bessemer, Pittsburgh	45.00 to 47.50
Bessemer, Youngstown	45.00 to 47.50

SLABS

Pittsburgh	$42.50 to 45.00
Youngstown	42.50 to 45.00

WIRE RODS

¼-inch and finer

Wire rods, Pittsburgh	$51.00 to 55.00

SKELP

Grooved skelp, Pittsburgh	2.45c
Universal skelp, Pittsburgh	2.45c
Sheared skelp, Pittsburgh	2.45c

Shapes, Plates and Bars

Structural shapes, Pittsburgh	2.50c to 2.60c
Structural shapes, Phila.	2.82c
Structural shapes, New York	2.84c
Structural shapes, Chicago	2.60c to 2.70c
Tank plates, Pittsburgh	2.50c to 2.60c
Tank plates, Philadelphia	2.82c to 2.92c
Tank plates, New York	2.84c to 2.94c
Tank plates, Chicago	2.60c to 2.80c
Bars, soft steel, Pittsburgh	2.40c to 2.50c
Bars, soft steel, Philadelphia	2.72c to 2.82c
Bars, soft steel, New York	2.74c to 2.84c
Bars, soft steel, Chicago	2.50c to 2.60c
Bars, refined iron, Pittsburgh	3.20c to 4.85c
Bars, rail steel, Chicago	2.30c to 2.40c
Reinforcing bars, Pittsburgh	2.40c to 2.50c
Bar iron, common, Phila.	2.72c to 2.82c
Bar iron, common, New York	2.74c to 2.84c
Bar iron, common, Chicago	2.60c to 2.75c
Bars, forging quality, Pitts.	2.65c

Hoops, Bands, Shafting

Hoops, Pittsburgh, large	3.15c to 3.50c
Hoops, Pittsburgh, small	3.50c
Bands, Pittsburgh	3.15c to 3.50c
Cold finished steel bars, Pittsburgh base	3.25c
Steel shafting, Pittsburgh	3.25c
Cotton ties, bundle 45 lb. Pittsburgh	$1.90

Rails, Track Material

Standard bessemer rails, mill	$43.00
Standard open-hearth rails, mill	43.00
Relaying rails, St. Louis	30.00 to 39.00
Relaying rails, Pittsburgh	30.00 to 34.00
Light rails, 25 to 45, mill	2.25c
Angle bars, Chicago base	2.75c
Spikes, railroad, Pittsburgh	3.15c
Spikes, small railroad, Pitts.	3.75c
Spikes, boat and barge, Pitts.	3.50c to 3.75c
Spikes, railroad, Chicago	3.25c
Track bolts, Pittsburgh	4.25c to 5.50c
Track bolts, Chicago	4.25c
Tie plates, Pittsburgh	2.60c to 2.75c
Tie plates, Chicago	2.60c

Spike, tie plate and track bolt prices for carlots.

Wire Products

To Jobbers in Carloads

Wire nails, Pittsburgh	3.00c to 3.10c
Plain wire, Pittsburgh	2.75c to 3.00c
Annealed wire, Pittsburgh	2.90c to 3.20c
Galvanized wire, No. 9 gage, Pittsburgh	3.35c to 3.60c
Barbed wire, painted, Pitts.	3.45c to 3.70c
Barber wire, galv., Pittsburgh	3.80c to 4.05c
Polished staples, Pittsburgh	3.45c to 3.65c
Galvanized staples, Pittsburgh	3.80c to 4.05c
Coated nails, count keg, Pitts.	2.70c to 2.75c
Woven wire fencing (retailers)	65 off
Woven wire fencing (jobbers)	67½ off

Chain, Piling, Strip Steel

Chain, 1-in. proof coil, Pitts.	6.50c
Sheet piling base, Pittsburgh	2.55c
Hot rolled strip steel, Pittsburgh stamping quality	3.30c
Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100-inch and heavier, 0.100-inch and heavier, base	5.25c

Sheets

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	3.85c
No. 28, bessemer, Pitts.	3.85c
No. 28, open-hearth, Phila.	4.17c
No. 28, open-hearth, Chicago	4.19c

TIN MILL, BLACK

No. 28, open-hearth, Pitts.	3.85c
No. 28, open-hearth, Chicago	3.84c to 4.34c

GALVANIZED

No. 28, open-hearth, Pitts.	5.00c to 5.25c
No. 28 bessemer, Pittsburgh	5.00c to 5.25c
No. 28, open-hearth, Phila.	5.32c
No. 28, open-hearth, Chicago	5.34c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	3.00c to 3.35c
No. 10, bessemer, Pittsburgh	3.00c to 3.35c
No. 10, open-hearth, Phila.	3.32c to 3.57c
No. 10, open-hearth, Chicago	3.34c

AUTOMOBILE SHEETS

No. 22 Pittsburgh	5.35c to 5.70c

Tin Plate

Per 100 lb. box

Tin plate, coke base, Pitts.	$5.50 to $6.00

Iron and Steel Pipe

Base Discounts Pittsburgh to Jobbers in Carloads

	Black	Galv.
1 to 3-inch, butt steel	61 to 62	49½ to 50½
1 to 1½-inch, butt iron	30	13

Boiler Tubes

Less Carload Discounts—Carloads 4 Points Additional

Steel 3¼ to 3¾-inch	38½
Charcoal iron, 3¼ to 4½-inch	5
Seamless hot rolled, 3½ to 3¾-inch	35

Cast Iron Water Pipe

Class B Pipe

Four-inch, Chicago	61.20 to 63.20
Six-inch and over, Chicago	57.20 to 59.20
Four-inch, Birmingham	53.00 to 54.00
Six-inch and over, Birmingham	49.00 to 50.00
Four-inch, New York	63.60 to 65.50
Six-inch and over, New York	59.00 to 60.00
Three-inch, Birmingham	59.00 to 60.00

Class A pipe is $5 higher than Class B.

Standard fittings, Birmingham, base, $110.00

6 to 24-inch, base; over 24-inch, plus $20; 4 inch, plus $20; 3 inch, plus $20; gas pipe fittings, $5 higher.

Scrap Still Is Declining

Prices Continue To Sink Lower as Consumers Remain Out of Market —Material Is Plentiful—Resumption of Buying Is Expected

SCRAP PRICES, PAGE 1714

Chicago, June 5.—Indifference and dullness are the prevailing features of the iron and steel scrap market here. A steel consumer has bought a tonnage of heavy melting steel estimated at 10,000 tons at about $19 per ton and is now in the market for further steel if it can be obtained at $18.50. Some dealers are confining their efforts to clean up scrap accumulations and will follow the market until conditions become more active. Quotations being received by railroads are below the figures asked of consumers and quite in contrast to the high prices offered them a few weeks ago. It appears a fair tonnage still remains undelivered on contracts which expire during June, but this is not having the effect of supporting the market. Foundries and rolling mills are buying relatively little of their grades. The Burlington railroad is offering 5000 tons, the Union Pacific 1000 tons, the Chicago, Milwaukee & St. Paul railroad 1700 tons and the Monon railroad 800 tons.

Heavy Melting Rallies

Boston, June 5.—Softness in heavy melting steel noticeable a week ago has disappeared and while the cast grades of scrap iron and steel still are weak, the market as a whole reflects the better condition of steel. An offer of the Jones & Laughlin Steel Corp. for steel at $22 Pittsburgh, was the signal for other steel makers to come into the market, and as a result competition developed here which in several cases brought the price up to $16.50 shipping point. Stove plate has exchanged hands at a new low price of $13 shipping point, but trading is so scant prices are nominal. A heavier tonnage of machinery scrap exchanged hands than has been usual during the last few weeks. One textile machinery foundry took several hundred tons of No. 1 cast at $25.50 delivered. Other sales of this grade brought the total up to between 1500 and 2000 tons. Demand for malleable continues in excess of tonnage produced and the price is firm at about $27 delivered. The Boston & Maine, the Boston Elevated, and several other producers sold large lots of scrap during the week, all of which were taken by local dealers. Rails for rerolling were sold at $16 shipping point.

Market Lags Further

New York, June 5.—While offerings are less free, the market on scrap, iron and steel has sagged off on a number of grades. Heavy melting steel is off $1, railroad steel 50 cents, and several descriptions of cast scrap and borings and turnings are down. Wrought pipe also is easier. Trading generally is light. The Bethlehem Steel Co. is buying some railroad steel at $18, delivered, and the Alan Wood Iron & Steel Co. at $18.50 to $19, but the tonnages are not large. Buying of steel for the Pittsburgh district also is restricted, such business as there is is going around $21 to $21.50, delivered. Demand for stove plate and grate bars continues to be somewhat dull.

With prices down dealers are making little effort to book business. The majority look for mill operations to continue heavy for months and in view of the light trading of the past few weeks, are confident requirements are accumulating. Therefore they are loath to sell at present prices. Increasing costs of collecting and handling material, to which higher wages are the principal contributing factor, also are tending to stiffen the position of dealers.

Heavy Buying Is Reported

Philadelphia, June 5.—Considerable buying of iron and steel scrap, particularly of heavy melting steel, was reported in this district during the past week. Prices vary considerably, some buyers having paid $20 delivered and $19.50 while others bought at $18.50. The market, therefore, is quotable at $18.50 to $20.

All Sales Are Small

Pittsburgh, June 5.—Small sales of heavy melting steel scrap at $21.50 make that the maximum figure quotable here, removing the $22 mark set by the majority of the purchases of the Jones & Laughlin Steel Corp. several weeks ago. Since those purchases, aggregating as indicated in IRON TRADE REVIEW at that time in the neighborhood of 50,000 tons, no large consumers have entered the market. In fact, those who were taking scrap such as users in Weirton, W. Va., Toronto, Warren, Massillon, Canton and other points in Ohio, all have issued holdup instructions and there is almost a total lack of activity. Monessen, Pa., continues embargoed. The Carnegie Steel Co. and the Jones & Laughlin Steel Corp. continue to ship scrap up the river in barges. The Butler and Brackenridge, Pa., consumers, remain out of the market and buying activity is confined to dealers. Railroad lists are for the most part normal in size; bids on the Pennsylvania lists, aggregating approximately 50,000 tons, close tomorrow but the consensus of opinion is that while the successful bids will be higher than the quoted market levels of today, they will not be as high as a month ago. Based on small sales and upon relative values, various grades are marked down 50 cents to $1 per ton.

Cleaning Up Old Orders

Buffalo, June 5.—Dealers in scrap iron and steel are busy cleaning up old orders. Rejections are continuing on material shipped, and dealers complain that mills are unreasonable in their demands. No buying has started, but consumption is heavier now than it has been. One large mill which is in heavy production is known to be nearing the end of its stockpile and is expected in the market soon. No sales have been made recently to make the price other than nominal.

Scrap Prices Still Decline

Detroit, June 5.—The scrap iron and steel market here has undergone another downward move in prices, the average reduction being about 50 cents a ton. Prices on the average are back to those of last fall, although some grades, such as heavy melting steel, automobile and machinery scrap still are a few dollars above the low mark. Cancellations are more numerous. Supplies of

(*Continued on Page* 1660)

Premiums Gone

From Early Ferromanganese Market —Consumers Pursue Waiting Policy

FERROALLOY PRICES, PAGE 1645

New York, June 5.—Premiums have disappeared entirely in the ferromanganese market A few sales for spot and early delivery have been made at $125, duty paid tidewater This comprised most of the business done during the past week Last quarter domestic ferromanganese continues obtainable at $120, duty tidewater of furnace.

Several hundred tons of spiegeleisen have been sold during the past week at $45 to $47.50 furnace for 20 per cent metal in lots of more than 100 tons, while sales of single carloads have been made at $50.

Ferrotungsten prices have risen slightly, sales being reported at 95 cents a pound contained, with a good steady business. Tungsten powder has been selling at $1 to $1.05 a pound. Tungsten concentrates have been turned over in moderate volume at $8 a short ton unit for offgrade ore; $8.25 to $8.50 for average ore and $8.75 for high grade ore. Chrome, vanadium and molybdenum quotations are unchanged. Ferrosilicon has been a little easier, at $90 to $95, delivered, at which prices carlots have been selling. Specifications against old orders for 50 per cent ferrosilicon have been extremely heavy.

Maintain Waiting Policy

Pittsburgh, June 5.—Consumers of ferroalloys continue their waiting attitude as regards new buying. Occasionally a small tonnage of ferromanganese for filling-in purposes is bought but for the most part, users are protected by contracts for all of the third quarter and at least a portion of the fourth. All of these, except in one or two unimportant cases, are taking all the tonnage shipped to them on contracts. Sellers here have thoroughly canvassed the trade and report that while several consumers have purchased a portion of their last quarter requirements, a number will have to buy fairly sizable tonnages. Domestic producers, filled up solidly with business until the middle of September, expect a buying movement to get under way the latter part of June or early July. Prices are unchanged a $120 to $130, seaboard base, depending upon the tonnage involved and the delivery wanted. Small less than carload lots are bringing as high as $140, seaboard base.

Interest in spiegeleisen continues to be manifest in intermittent fashion. Interests like the Griffin Wheel Co., American Steel Foundries, and other large users have decided not to take action on their recent inquiries involving up to

1500 tons at a time. All other alloys are quiet.

Spiegel Sales of Carloads

Philadelphia, June 5.—A moderate amount of business in spiegeleisen in carload lots was done the past week at $50, furnace, for 20 per cent. On larger lots, $47.50, furnace, is quoted.

Chicago Market Quiet

Chicago, June 5.—Ferromanganese is steady and unchanged. An inquiry for 50 tons of spiegeleisen is current. The market is unchanged at $45, furnace, for contract, and $47.50 for spot carloads.

Container Makers

Seek To Add To Tin Plate Tonnages —Books Are Loaded

TIN PLATE PRICES, PAGE 1645

Pittsburgh, June 5.—Anticipating the biggest tin plate consuming year in history, container manufacturers are manifesting uneasiness because they believe they have not fully covered requirements. They are making efforts to purchase 10,000 to 20,000 additional base boxes but are not meeting with much success in obtaining promises of deliveries within the time they expext to require the material. Mills for the most part are heavily booked and shipments are huge. For some large interests, aggregate shipments for the first five months of the year exceeded the best corresponding period in their histories. The most of these shipments were completed in March, April and May, since due to transportation difficulties large tonnages were piled during January and February. More or less typical in this regard is the position of the American Sheet & Tin Plate Co. whose May shipments of hot mill products exceeded any previous May in its history by several thousand tons. Operations suffered somewhat last week because of the holiday celebration and the continued hot weather is adversely affecting operating schedules this week. Last week the general average of tin plate mill operation did not exceed 80 per cent.

More and more the $5.50 per base box 100 pounds, Pittsburgh price is coming to represent the general market. It is maintained consistently by the Steel corporation and by numerous independents, although in certain isolated cases some of the latter still are obtaining $5.75 and occasionally as high as $6 still is done. Little or no inquiry is developing from abroad.

Japan Wants Lot

Philadelphia, June 5.—The Nippon Oil Co. of Japan is inquiring for from 12,000 to 15,000 boxes of tin plate for immediate shipment but may buy oil containers instead.

L. R. Huffman, Elkhart, Ind., manufacturer of motor trucks, recently bid in the assets of the Barton Axle Co., Barton, Wis., for $76,000 at trustee's sale. It is understood that upon qualifying with the terms of the sale, Mr. Huffman will resume work in the plant, which has been closed about a year.

Semifinished Is Easier

More Active Demand Noted for Billets—Bessemer Quality Sold at $44, Pittsburgh—Sheet Bars Placed at $42.50

SEMIFINISHED STEEL PRICES, PAGE 1645

Pittsburgh, June 5.—Interest in open-hearth billets is the outstanding feature of this week's semifinished steel market. Several inquiries are out, involving up to 2000 tons at a time, one coming from a Sharon, Pa., interest. The recent sale of 1500 tons of 1¾-inch bessemer billets indicates a base of $44, Pittsburgh, on the 4 x 4-inch size, although some continue to quote $45, base. A shortage of open-hearth billets still is noted although mills are catching up on deliveries. The market on billets of forging quality is more clearly defined since the sale of 300 to 500 tons was consummated in the past week at $55, base Pittsburgh, and that price has prevailed in quotations on several lots involving 200 to 500 tons now pending. For some mills to take on more wire rod obligations would be to rob their own wire products department, hence buyers of wire rods now coming into the market are finding it difficult to place their tonnages. The price spread is $51 to $55, Pittsburgh. As deliveries on skelp contracts are being made at a faster rate, stocks in the hands of conversion mills are increasing due to the fact that a curtailment of labor forces in pipe and tube mills is cutting down the consuming rate. Because the same labor condition prevails among the pipe mills which sell skelp, they have more skelp to offer. They are glad to accept 2.45c, base Pittsburgh. Sheet bar customers are not doing anything but accepting shipments on second quarter contracts, and awaiting the price announcement for the third quarter. This is expected to show no change.

Forging Billets Lower

New York, June 5.—The market for standard open-hearth forging billets again has eased off slightly and now is quoted at $51 to $53, base Pittsburgh. In rerolling billets, the market has not been tested during the past week and is quoted nominally at $43 base Pittsburgh. The supply of wire rods has broadened considerably and consumers now are having less difficulty in filling their requirements. The minimum price on wire rods continues $51, base Pittsburgh, with occasional moderate lots at $55.

Sheet Bars Offered at $45

Youngstown, O., June 5.—While slabs and billets have been sold for delivery in the next quarter, by far the largest portion of semifinished steel to be delivered during the period is sheet bars. Numerous contracts have been made for this commodity at $45, Youngstown, but in some cases only tentative arrangements have been made whereby a certain producer promises to deliver tonnage against $45, Youngstown. One consumer of sheet bars was offered tonnage this week for immediate rolling at $44, Pittsburgh, by three producers outside this district.

Sheet Bars Sold at $42.50

Cleveland, June 5.—Some buyers continue to make inquiries here for semifinished steel, though the leading maker is committed on its full tonnage of standard material for the third quarter. The market is quiet. Some sales of several thousand tons of sheet bars have been made by another interest in northern Ohio at $42.50, valley; while on a small tonnage of billets $45, valley, has been done. The buyer of this lot wanted a much larger tonnage than the mill could allow as an insert in its rolling schedule.

Wire rods are easier in that $51 Pittsburgh. The American Steel Wire Co. price is representative of the competetive market whereas recently as high as $55 was paid.

Billet Sales in Small Lots

Philadelphia, June 5.—Billet business is fair, mainly in small and moderate lots. Open-hearth rerolling billets are quotable at $43 to $45,, base Pittsburgh. For forging quality the most general price is $53, although $54 is asked in some instances. Anything under $53 is very exceptional.

Nails and Wire

Continue in Heavy Demand—Labor Shortage Restricts Output

WIRE PRICES, PAGE 1645

Pittsburgh, June 5.—Wire product makers for the most part are enjoying a healthy and stable market and while operations generally do not exceed 75 or 80 per cent the only limiting factor in this regard is the shortage of labor. Nail business of all kinds continues heavy; in fact demands, are so pressing a proper amount of attention cannot be paid inquiries for bright wire. Mixed carload business involving, nails, barbed wire and fencing are increasing, whereas usually at this season of the year, this character of buying is absent. Wire product prices are unchanged, plain wire 2.75c and nails, 3.00c, base Pittsburgh. Several wire makers report because they need such large tonnages of wire rods in their own finishing departments, they are unable to entertain any wire rod business for delivery this side of late September or early October.

Supply Is Easier

New York, June 5.—While the mills continue three to four months behind in their nail schedules and around three months behind on wire, the supply is somewhat easier and less premium business is being done. However, the market continues firm at 3.00c base, Pittsburgh, for nails and 2.75c for wire.

Nail Demand Holds Firm

Chicago, June 5.—Little change has taken place in the wire and nail market here, with demand for nails remaining much in excess of what proucers can meet. Barbed wire is in less demand, a seasonal feature, but since fall terms have been offered on fencing, demand for that commodity has increased and a large tonnage is being booked. Prices remain unchanged.

Bar Orders Are Better

Consumers Show More Confidence—Chicago Mills Continue To Decline Additional Business in Present Congested Market

BAR PRICES, PAGE 1645

Chicago, June 5.—While sales of steel bars at Chicago total a smaller tonnage than mill production and shipments, the situation is due to considerable business being refused by mills and to the action of many consumers, who are being advised to wait rather than come into the present congested market with their later needs. Deliveries are being sought by all consumers with as much anxiety as ever, showing that steel is being consumed in spite of the present condition of inquiry. Premiums on finished steel have practically disappeared. Dealers in reinforcing bars are seeking to buy much more of this material than mills are able to furnish, indicating that reinforced concrete building is going ahead with practically no letup. Soft steel bars are available at Chicago at 2.50c to 2.60c.

Bar iron is in good demand with new tonnage about equal to production. Deliveries continue good and demand has not fallen off. This material is quoted 2.60c, Chicago. Rail steel bars are being sought by reinforced concrete builders and implement manufacturers are specifying fully for this material. The quotation is steady at 2.30c, Chicago mill.

Producers Deny Weakness

Pittsburgh, June 5.—Producers of merchant steel bars deny the market shows any price weakness. Forward buying is not heavy but reports of concessions under the 2.40c, base Pittsburgh price are not substantiated. Some buying for third quarter has been done but the majority of consumers, particularly among the finishers of cold-drawn steel bars are holding off. One large interest is receiving specifications on the July requirements of its customers. These consumers as well as customers of other makers indicate there is no letup in their own business and expect their third quarter needs will be fully as large as were their second quarter requirements. Many less than carload orders for refined iron are being received along with a fair sprinkling of orders for single carloads and larger. Producers of refined iron bars have enough business on hand to permit them to run 100 per cent but in this they are hampered by a labor shortage, etc. The 3.15c price on refined iron has practically disappeared and one maker states 3.20c is its absolute minimum. From that level, 3.20c, base Pittsburgh and 3.25c up to 4.85c is the quoted spread on refined iron depending upon the degree of refinement.

New Business Is Increased

Cleveland, June 5.—Buyers show more confidence than recently in placing business against definite requirements and an appreciable increase in new business has resulted. The total tonnage taken, however, is not heavy. In some cases consumers are covering against expected third quarter requirements and in at least one case an inquiry was made for fourth quarter and for first quarter of next year. Demand upon the mills for tonnage on old orders shows no lessening. Prices appear firm at 2.40c, Pittsburgh, with the larger producers, which are promising nothing under four to five months. A lake mill which recently offered bars in this district for two to three weeks delivery at 2.50c, Pittsburgh, booked a fair tonnage. Another large producer continues to quote 2.50c, Pittsburgh, though 2.40c has been made where attractive extras apply. Some talk is current of shading in heavy bands, the minimum of which has been 3.15c, Pittsburgh. This price is reported to have been cut $2 a ton in one case. Light hoops and bands are quoted up to 3.75c, Pittsburgh.

Price Average Is Less

Boston, June 5.—The total tonnage of steel bars sold in New England during the past week fell off as compared with the previous week. The price also has softened slightly. A week ago the majority of the sales reported were at 2.50c Pittsburgh base. Recent trading has probably averaged more at 2.45c than at 2.50c and a few sales below the 2.45c mark have been noted.

Mills Operate to Capacity

New York, June 5.—While demand for steel bars has eased off materially, the volume of business continues of proportions sufficient to keep even the small eastern mills going at capacity. These interests usually are obtaining 2.50c, base Pittsburgh for early shipment, which figure represents the top of the market. The minimium price with the large mills continues 2.40c base Pittsburgh and in some cases these interests are fitting tonnage into their schedules for early rolling for regular customers at this price.

Cold-Drawn Buying Fair

Pittsburgh, June 5.—Although a large forward buying movement is absent from the cold-drawn steel bar market, during the past several days a fairly sizable aggregate tonnage has been closed. Present demand by no means is speculative and whatever is being bought is going into consumption. Inquiries involve sizable tonnages and come from different lines of industry. Curtailment of the automotive industry is not resulting in any great setback for the cold-drawn trade since it itself is slight and other consuming lines are taking their full quotas. The price is unchanged at 3.25c, base Pittsburgh.

Bolt, Nut, Rivet Prices Have Been Shaded

NUT AND BOLT PRICES, PAGE 1710

Pittsburgh, June 5.—Incoming orders for nuts, bolt and rivets continue at such a high rate, makers here are unable to catch up on deliveries. They are just as far behind as they ever were and recently more carload business has been transacted. These orders are coming from different lines of industry and the quoted prices grow firmer. The market on rivets likewise is fairly lively with numerous carload orders noted from week to week.

Third Quarter Buying Near

Chicago, June 5.—Demand for bolts and nuts continues dull but makers are offering third quarter contracts on the same schedule of discounts as for second quarter. Users are going over their requirements with a view to placing their business for this delivery. This product is showing less activity than practically anything else in the iron and steel market.

Quotations Being Shaded

Cleveland, June 5.—Specifications against contracts for bolts and nuts are understood to be heavy. However, new business is light, this being due it is thought to the fact, the present period is midway between the contracting dates. Nevertheless, while some makers report they are having little difficulty in obtaining the quoted prices, it is reported by other interests that some shading is being done.

The leading rivet maker here reports it is holding its prices of 3.25c and 3.35c on structural and boiler rivets respectively, despite the fact some shading as much as several dollars a ton, has been done by some interests. The shading, however, it is understood is not general. Specifications against contracts are heavy but new business is light.

Shipments of Iron Ore Show Large Gain

ORE PRICES, PAGE 1710

Cleveland, June 5.—Shipments of iron ore from the Lake Superior district in May totaled 6,671,705 tons, compared with 1,585,305 in May 1922. The total to June 1 this year is 6,685,889 compared with 1,721,466 to June 1, 1922, the increase this year being over 288 per cent. The total in 1920 to June 1 was 6,976,085. In 1920 the shipments for the season amounted to 58,527,226. The Lake Superior Iron Ore association gives the following details with respect to shipments in May, by ports:

	May, 1922	May, 1923
Escanaba	177,719	929,960
Marquette	70,125	288,668
Ashland	272,134	747,104
Superior	669,297	1,793,025
Duluth	217,062	2,027,300
Two Harbors	178,968	885,648
Totals	1,585,305	6,671,705

The market for ore is dull, the majority of furnaces have made their purchases.

Hoop Makers Obligated

HOOP PRICES, PAGE 1645

Pittsburgh, June 5.—Hoop and band makers generally have obilgated their entire tonnage for the third quarter. While a large portion of the output is consumed by the automotive industry, the cooperage trade uses large tonnages and orders from both directions have been a feature of the market for several weeks past. Strip steel makers report they have more business in the hoop and band sizes of hot-rolled flats than they really care for but they are discharging these obligations as fast as pos-

sible. The regular hoop and band price is 3.30c, base Pittsburgh. The narrow sizes and light gages carry a 3.50c, base Pittsburgh figure.

Much Iron Ore Imported

Philadelphia, June 5.—Imports into this port for the week ending June 2, were as follows: Ferromanganese, from England, 341 tons; ferrosilicon from England, 100 tons; manganese ore, from Turkey in Europe, 440 tons, from Calcutta, 2500 tons; iron ore, from Algeria, 18,404 tons, from Sweden 13,387 tons, from Spain, 7530; pig iron, from Nova Scotia, 4828, from Sweden, 30.

Manganese Ore Active

New York, June 5.—A large tonnage of manganese ore now is under negotiation. Prices are unchanged from the recently prevailing level, but are largely nominal. The trade is interested to see what will develop in connection with the pending business. Actual sales include one lot of 6500 tons of ordinary Caucasian ore, the price not being announced. Good sized manganese ore inquiries are pending.

Blast Furnace Operation Is on High Level

Pittsburgh, June 5.—The rebuilt furnace of the Sharpsville Furnace Co., Sharpsville, Pa., which has been idle for two years is scheduled to be blown in today. This leaves but three out of 46 stacks idle in the Youngstown district, all in the Shenango valley, the Atlantic furnace of the Republic Iron & Steel Co., at New Castle, Pa.; one each of the Valley Mould & Iron Corp., and the Shenango Furnace Co.

The Carnegie Steel Co. continues to keep every blast furnace in Pennsylvania but one blowing, that being one of the Duquesne furnaces which is out for rebuilding. This with one at Mingo Junction, O., two at Columbus, O., and one each at Zanesville and Steubenville, O., out, it has only six out of the 59 stacks idle. The Jones & Laughlin Steel Corp. is operating 100 per cent of blast furnace capacity as is the National Tube Co., the Pittsburgh Steel Co., the Pittsburgh-Crucible Steel Co., etc.

Notwithstanding the holiday, steel mill operation was kept at a righ rate and despite intermittent labor shortages, accentuated by the present hot weather, the average is around 92 per cent. The Carnegie Steel Co. continues to operate around 95 per cent of capacity but many of the independents are unable to attain that level.

The McKeefrey Iron Co. stack at Leetonia, O., finally is in blast but the Ella furnace of the Reliance Coke & Furnace Co. probably will be blown out within 10 days and the Kittanning Iron & Steel Mfg. Co. stack at Kittanning, Pa., is scheduled to be blown out early next week.

Made Sales Agent

E. Arthur Tutein, Inc., New York, Philadelphia and Boston, has been appointed exclusive sales agent for pig iron for the Thomas Iron Co., Hokendauqua, Pa., effective June 1.

Plate Business Picks Up

Growing Volume of Orders Noted in East and Elsewhere—Several Tank Jobs Placed—Three Lake Boats Are Figured

PLATE PRICES, PAGE 1645

Philadelphia, June 5.—Plate business which has been held back in recent weeks in expectotion of lower prices now is coming out in good volume, though limited largely to small and moderate lots. The total does not equal current shipments, which continue at a high rate. Two eastern mills broke their production records last month. Current prices are somewhat easier. On most business for early shipment eastern mills obtain 2.60c base Pittsburgh. In some cases where attractive tonnages are involved, however, 2.50c is done. Eastern mills in some instances have booked third quarter contracts at 2.50c. The Reading railroad has not yet closed its inquiry for approximately 1500 tons of plates.

Tanks Are Ordered

Pittsburgh, June 5.—One of the largest orders for oil storage tanks placed in several weeks has just been divided evenly between the Petroleum Iron Works Co., Sharon, Pa., and the United Iron Works, Inc., Kansas City, Mo., by the Magnolia Petroleum Co. Galveston, Tex. Each tank builder received an order for ten 55,000-barrel tanks for erection in Texas, the total requiring about 4000 tons of plates. The Riter-Conley Co., Pittsburgh, recently received an order for three 80,000-barrel tanks for erection in California for an unnamed interest. This involves 900 tons of plates. The Pittsburgh-Des Moines Steel Co., has been awarded a number of water-softening tanks for different stations of the Chesapeake & Ohio railroad, requiring about 700 tons. Inquiries are more numerous. The Treadwell Construction Co., Midland, Pa., and other nearby fabricators are obtaining quotations on approximately 2000 tons of plates for oil storage tanks to be erected in California. The Bethlehem Steel Co. is receiving specifications on some third quarter business for plates to be delivered in July. The plate market is considered quotable at 2.50c, base Pittsburgh.

Tend to Hold Up Buying

New York, June 5.—The tendency to hold up plate buying is more pronounced and a number of consumers say they have joined the "buyers' strike." The supply is easier and one large maker now is circularizing the trade saying that it is prepared to book all specifications placed in June at 2.60c, base Pittsburgh. This price represents the general market on plates for earily shipment, although in execptional instances 2.50c has been done on early shipment. The volume of business in fabricated plate work such as oil storage and other tanks is very small. A few small tank jobs which have been up for bids lately, including one comprising about 2500 tons of plates, have been postponed. The Pittsburgh mills continue to quote 2.50c, base Pittsburgh, on plates for shipment at mill's convenience, which means several months ahead.

Three Lake Vessels Pending

Cleveland, June 5.—Inquiries are pending for three additional lake freight vessels which it is estimated will require about 10,000 tons of plates. The prospective buyer of these boats has not been disclosed. This is the first shipyard business to appear on the lakes in some weeks and the project is pointed to as an indication of confidence in present conditions. More business is moving in the plate market in a scattered way than for several weeks though in small lots individually. One lot of 600 tons for jail cells was placed by a local fabricator. Other structural shops have been buying and some good sized orders have been placed for stock. Premium prices continue to ease downward. Local mills are naming 2.65c, Pittsburgh, after having recently held at 2.75c and have taken business in the week on the former basis. Eastern mills are quoting 2.65c to 2.75c mill. The minimum of the market remains 2.50c, Pittsburgh, as named by two large producers while a third continues to quote 2.60c, usually for delivery in about six weeks.

Urge Speedy Delivery

Chicago, June 5.—With order books crowded with business builders of railroad cars are urging mills to hurry shipments, as steel is not being delivered as rapidly as required. Railroads are seeking to use their influence to obtain more rapid shipment of plates and other finished steel. At present oil companies are not adding to their storage tank capacity, which has relieved the pressure on plate mills. The government is asking bids on 4000 to 5000 tons of steel plates for the construction of barges. Builders of oil storage tanks are seeking as early delivery as possible on plates for that purpose. Quotations on steel plates range from 2.60c to 2.80c, Chicago mill, the higher price applying on a small tonnage for prompt delivery.

Chicago Is Unchanged

Chicago, June 5.—Steel mill operation at Chicago is unchanged, the Illinois Steel Co. continuing all its 12 blast furnace stacks in activity and operating its finishing mills practically at capacity. Inland Steel Co. continues at 75 to 80 per cent of capacity, the rate which has prevailed for several weeks.

Made Mill Agent

J. C. Wicks & Co., Hanna building, Cleveland, have been appointed sales agent in the Cleveland territory for the Central Iron & Steel Co., Harrisburg, Pa., manufacturers of plates. The company also handled sheets and strip steel.

Two well known Connecticut companies recently were out of business by the auction route. The machinery and equipment of the Rowe Calk & Chain Co., Plantsville, Conn., on May 23 was sold, while that of the Fiala Arms & Equipment Co., New Haven, Conn., was auctioned May 25. Both companies were in the hands of receivers.

Concrete Inquiry Larger

Activity Increases in Reinforcing Bar Market as More New Projects Are Brought Up for Figures—Lettings of Small Tonnages Continue

REINFORCING BAR PRICES, PAGE 1645

Pittsburgh, June 5.—The market on reinforcing concrete bars is fairly active both from an order and from an inquiry standpoint. One of the largest inquiries out at present involves approximately 1000 tons for two or three buildings for the Bessemer Gas Engine Co., Grove City, Pa. This tonnage probably will be bought this week. The tonnage for the local freight house for the Baltimore & Ohio railroad has been awarded to Frainie Bros. & Highley, Baltimore. About 500 tons are involved in this and will be bought this week. The general contract for the north side warehouse for the Donaldson Transfer & Storage Co., involving 250 tons went to F. B. Herendeen, who also obtained the general contract for a new addition to the Kingsley House Settlement, Pittsburgh, of about 100 tons. Contracts for the bars in these two jobs will be let shortly. The Metzger-Richardson Co., was awarded 125 tons for the Jackson building, Water street, Pittsburgh. Another job about to be awarded is that of a building for the West Penn Power Co., at Springdale, Pa., involving approximately 550 tons. One concrete bar seller has recently reduced his asking price from 2.90c to 2.75c; others are quoting 2.55c and 2.65c, base Pittsburgh. The general mill quotation, however, is unchanged at 2.40c, base Pittsburgh.

Concrete Business Dwindling

New York, June 5.—New lettings of concrete reinforcing bars reported in this district involve a small tonnage in the aggregate. Not only is there a seasonal letup, but the numerous factors which are discouraging building construction generally are causing the business in concrete bars to dwindle. Some business again is being done in concrete bars for mill shipment. This business is going at all the way from 2.40c to 2.60c, base Pittsburgh. The market on concrete bars for shipment out of warehouse continues to be quoted at 2.75c to 2.90c, base Pittsburgh.

Prospective Business Encouraging

Cleveland, June 5.—An increasing volume of inquiry, although mostly for projects requiring small tonnages, gives the reinforcing bar market a stronger tone than for some weeks past. No large projects were brought up for figures during the past week and the largest letting was that of 75 tons for the Spencer building, Cleveland, to Bourne-Fuller Co. No award has as yet been made of the 1400 tons required for the Baldwin-Fairmount reservoir project, for which Stange-Walsh Construction Co., is general contractor. The Lundoff-Bicknell Co. was awarded the general contract on the medical clinic building, Euclid avenue and Ninety-third street, Cleveland, requiring 160 tons of concrete bars. Among the largest of the new inquiry brought up was that of 40 tons for the Euclid-Sixty-sixth building, Cleveland. On the small tonnage being placed there is no tendency to shade 2.40c, base Pittsburgh, on new steel bars, while 2.90c is being quoted on goods out of stock.

Much Tonnage In Prospect

Chicago, June 5.—Returning activity is noted in the market for reinforcing bars after the lull of the past few weeks and a large number of projects are coming out for figures. Inability to obtain delivery on structural steel is increasing demand for reinforced concrete construction and conditions generally are favorable. In a recent instance a building project was abandoned because steel could not be obtained short of 10 months delivery. Bars continue at 3.15c, Chicago warehouse, and this price is strong. Indications are that quotations will be no lower and perhaps may rise, one reason being that bars for third quarter will be from $3 to $5 per ton higher at the mill than during second quarter.

CONCRETE CONTRACTS PLACED

Awards this week	1,735 tons
Awards last week	2,470 tons
Awards two weeks ago	4,925 tons

500 tons, Book hotel, Detroit, to Kalman Steel Co., instead of to Concrete Steel Co., as recently reported.

300 tons, sewer, Jersey City, N. J., to Truscon Steel Co.

250 tons, warehouse for Louis F. Dow, St. Paul, to Concrete Steel Co.

225 tons, store building for Smith, Bridgeman & Co., Flint, Mich., to Truscon Steel Co.

200 tons, school at Rochester, N. Y., to Kalman Steel Co.

200 tons, Westport school, Baltimore, to National Concrete Metal Forms Corp.

150 tons, building for Barclay & Co., Morsemere, N. J., to Kalman Steel Co.

110 tons, work for Peavley Dairy Co., St. Louis, to Concrete Steel Co.

100 tons, Gill garage, Madison, Wis., to Corrugated Bar Co.

100 tons, exchange for Cincinnati Bell Telephone Co., Cincinnati, O., to Pollak Steel Co.

100 tons, school building at Huntington, L. I., to National Concrete Metal Forms Corp.

CONCRETE CONTRACTS PENDING

1000 tons, two or three buildings for the Bessemer Gas Engine Co., Grove City, Pa.; order to be placed this week.

550 tons, building for the West Penn Power Co., Springdale, Pa., action to be taken this week.

500 tons, Pittsburgh warehouse for Baltimore & Ohio railroad; general contract awarded Frainie Bros. & Highley, Baltimore, announced last week as awarded to unknown fabricator.

400-600 tons, from 200 to 300 tons each for Paul Revere and Moses Cleveland schools, Cleveland; bids in June 18.

350 tons, Allegheny county bridges; bids to be closed shortly.

250 tons, warehouse for the Donaldson Transfer & Storage Co., Pittsburgh; general contract awarded to F. B. Herendeen, Pittsburgh.

250 tons, drainage project, Riverdale, Ark.; bids asked.

200 tons, power house and creamery for Fairmont Creamery Co., Fargo, N. D.; bids in.

160 tons, medical clinic building, Euclid avenue and Ninety-third street, Cleveland; Lundoff-Bicknell Co., general contractor.

125 tons, hotel at Henderson, Ky., H. L. Stevens & Co., Chicago, engineers; bids in.

125 tons, Jackson building, Water street, Pittsburgh; general contract awarded to Metzger-Richardson Co., Pittsburgh.

100 tons, new addition to the Kingsley House Settlement, Pittsburgh; general contract awarded to F. B. Herendeen, Pittsburgh.

Large Tonnage

Of Pipe Being Closed at Cleveland—Pipe Line Projects in Sight

PIPE PRICES, PAGE 1645 AND 1710

Cleveland, June 5.—Interest in the local pipe market has been stimulated greatly in the past week, through the award of part of the tonnage required for the new coagulation basin of the Baldwin-Fairmount reservoir and pumping station project. The Stange-Walsh Construction Co. was awarded the general contract for the job and also a contract for 210 tons of pipe, at $80 for the 6, 8, 10 and 12-inch and at $170 to $250 for the fittings.

Approximately 20,000 tons of pipe and fittings will be contracted for before the end of the year, acording to engineers in charge of the project. Bids are now being advertised for to be opened June 22, on 10,045 tons of pipe for the Random road main contract No. 31 of the Baldwin-Fairmount project. Of the total tonnage involved, 98 per cent will be 24-inch.

Besides the award to the Stange-Walsh company, 1650 tons were recently let to the United States Cast Iron Pipe & Foundry Co., totaling a cost of $123,646. This order was composed of the following classes of pipe: 750 tons, 48-inch, class E, at $58.50; 175 tons, 48-inch, class B, at $58.50; 27 tons, 60-inch, at $58.50; 260 tons, 30-inch, at $58.50; 60 tons, 24-inch, at $58.50; and standard and special fittings at $140 to $180.

Trading Continues Light

New York, June 5.—Bids will be closed June 12 by Woodbury, N. J., on a substantial tonnage of cast iron pipe, most 16-inch, and June 23 by Yonkers, N. Y., on 600 tons, also comprised largely of 16-inch. The department of water supply, this city, has awarded the general contract for supplying and installing 160 tons of 8 to 12-inch to C. De Blaiso, who, in turn, has placed the pipe with the Donaldson Iron Works. Trading, as a whole, continues rather light, with prices unchanged. Most makers in this district are unable to do better than October delivery on the majority of sizes.

The Public Service Gas Co., a subsidiary of the Public Service Corp. of New Jersey and will add 60 miles of pipe to its present system to meet new service demands. Orders for 3500 tons of 4, 6 and 8-inch gas pipe have been placed for delivery Aug. 1.

Press for Deliveries

Pittsburgh, June 5.—Steady pressure is being brought to bear upon tubular goods producers from jobbers of standard merchant pipe for their stocks and upon buyers of oil country goods. The former are unable to maintain fair sized stocks and the latter are making every effort to complete the oil well drilling started. Since from 2000 to 4000 wells are rigged up each month at this season and each well requires an average of three carloads of tubular goods, the aggregate tonnage involved is large.

Inquiries, for line pipe vary from

40,000 feet of 8-inch wanted by a natural gas company immediately, to 110 miles of 8 and 10-inch line pipe wanted within the next few months for a line in California. Pipe producers are called upon to entertain tentative inquiries for pipe lines to be installed next fall. Among five such inquiries now current is one for 225 to 450 miles of 16-inch and one of 50 to 100 miles of 10-inch. Some pipe purchasers are endeavoring to find soft spots in the market.

Better Pipe Inquiry

Chicago, June 5.—Late season buying by cities is beginning to appear in the cast iron pipe market. Makers are slow to take on new business except in certain sizes. Deliveries are slow, some of the larger sizes being available in 8 to 10 weeks, while other sizes require much longer. Prices are strong and unchanged. The U. S. Cast Iron Pipe & Foundry Co. has been awarded 5000 tons at Flint, Mich. Bids will be opened June 5 at Clawson, Mich., on 300 tons and at Milwaukee on 150 tons. Detroit opened bids yesterday on 100 tons.

Small Lot Lettings Received

Birmingham, Ala., June 4.—Small-lot lettings are still being received by local cast iron pipe makers, the business coming in from the Middle West and Northwest in particular. Some advances in price have been paid by consumers who have been in a hurry to get the product but the market in general continues on the same basis as for the past several weeks. Some pipe recently went to Cuba. Not much pipe is to be found on yards, indicating shipments have been up to production. DeLavaud method pipe is finding a ready demand.

Large Warehouse Demand Still Maintained

WAREHOUSE PRICES, PAGE 1706

Boston, June 5.—The recent decline in warehouse prices has developed a considerable tonnage demand which might otherwise have gone to mills direct. Building jobs which were nearing completion and which will add two or three stories require spot shipment of structural steel to prevent delays and this means buying from warehouse stocks.

Trading Continues Brisk

New York, June 5.—While not as active as in April, trading in the local warehouse market continues brisk, holding up well to the rate prevailing in May.

Demand Is Maintained

Philadelphia, June 5.—Demand for iron and steel products out of warehouse continues well maintained. Prices are firm and unchanged.

Mills Buyers Taking Tonnage

Cleveland, June 5.—Local jobbers in iron and steel products report demand continues heavy for practically all classes of material. Regular mill buyers are placing orders and the volume of business being placed is quite imposing. Prices are firm at the established levels.

Sheet Business Narrows

Volume of New Tonnage Is Lighter, Demand for Galvanized Bein Most Active—Detroit Motorcar Builder About To Contract

SHEET PRICES, PAGE 1645

Youngstown, O., June 5.—Not much change is apparent in the sheet market. The volume of new business being placed is small compared with the tonnage entered a few weeks ago. Inquiry has receded considerably especially for black sheets. Prices are firm as far as can be learned, with black quotable at 3.85c, blue annealed 3.25c for 13 gage and lighter and 3.00c for heavier gages, and 5.00c for galvanized, Pittsburgh. In quoting on black tonnage producers frequently are obliged to offer a three-weeks delivery as an incentive to obtain the business. The majority of mills here are scheduled from four to six weeks ahead, but under present conditions with a shortage of workmen and the decrease in tonnage due to hot weather, present bookings probably will not be worked off until the close of July. Many of the sheetmakers here plan to close down their mills during the first week in July to make repairs. From present indications no letdown in operating schedules for lack of business is contemplated through the remainder of this quarter. A large consumer of sheets in the Detroit district who has had quotations on his third quarter requirements for two weeks or more is expected to begin placing business during the latter part of this or the early part of next week. This may bring out third quarter business from other consumers in that territory. High-grade sheets continue quotable here at 5.35c Pittsburgh. One large buyer is reported to have requested mills to postpone shipment of his June tonnage until July.

Inquiries For Galvanized Heavy

Pittsburgh, June 5.—Booked up as they are on certain grades and sizes so that output for several months already is pledged, based on present operating schedules, sheet manufacturers generally are optimistic concerning the future. Those mills willing to accept galvanized sheet business report a fair return of profit, based on the present spelter market; others report continued difficulty in obtaining labor properly to man their galvanizing departments. Numerous galvanized sheet buyers seek to place tonnages, so that the aggregate of pending inquiries for this grade is large. Prices from 5.00c, base Pittsburgh, the American Sheet & Tin Plate Co. level, up to 5.25c are encountered. No further weakness is manifested in the black sheet market and while a buyer or two recently obtained tonnages at 3.75c, Pittsburgh, in the Youngstown, O., territory, this is not now thought to be possible, notwithstanding the over production of black sheets, the market on which is 3.85c. Diversified lines of industry are represented in the buying of the black grade. Commitments in blue annealed are particularly heavy and some of the obligations cannot be discharged until September or October. From 3.00c to 3.35c, continues to represent the market. Buying of full finished automobile sheets likewise has totaled high so that many orders cannot be executed for many weeks. More purchases are scheduled to be made this week and next since the curtailment of automobile production is but slight and commensurate with the usual slackening during the summer months. In the Detroit district for instance, it amounts to about 10 per cent which means little or nothing in the way of curtailed sheet buying. From 5.35c to 5.70c still is quoted on full finished automobile sheets. May shipments of hot mill products, largely sheets, while not as heavy as March, are heavier than any previous May on record for representative sheet producers here, by several thousand tons.

Inquiry In Good

Buffalo, June 5.—Sheet business is good, with inquiry keeping up. A local maker is quoting 4.00c Pittsburgh but 3.85c is being done on black sheets by mills selling in the district.

Chicago Mills Out of Market

Chicago, June 5.—Western producers of steel sheets are out of the market for nearby delivery. Operations have been reduced because of the heat. The Inland Steel Co. is operating 14 of its 18 furnaces. Sheet consumers continue to press mills for delivery on their contracts and also use every effort to obtain further tonnage on books.

More Contracting in East

Philadelphia, June 5.—Sheet mills are receiving heavy specifications on contracts. Considerable further third quarter contracting also is noted. It is estimated 40 per cent of the consumers in this district now are covered for the third quarter. The general volume of new demand is less than recently, and the supply situation is easier. Prices generally are firm. Blue annealed is 3.00c to 3.25c, base Pittsburgh, black 3.85c and galvanized 5.00c.

Many Strip Buyers Cover

STRIP PRICES, PAGE 1645

Pittsburgh, June 5.—Buying of both hot and cold-rolled strip steel is well under way so that many customers have covered their requirements for all or at least a portion of the third quarter. This largely has been done at the 3.30c, base Pittsburgh level on hot and at 5.25c, base Pittsburgh on cold. On the narrow sizes of hot-rolled, 3.50c, base has applied. Moreover buyers who have covered and those who are about to cover, indicate needs which compare favorably with their second quarter consumption. Some slight falling off is expected in the summer but as it looks now, shipments for the third quarter will nearly equal those of the second. One representative company states that while March shipments were large, April's were larger and May figures just compiled show shipments exceeded April's by about 20 per cent. June is expecte! to come up to May.

Shape Market Brighter

Optimism in Structural Shape Dealings Reflects Upturn of Demand —Award 6200 Tons for Flushing Subway, New York

STRUCTURAL SHAPE PRICES, PAGE 1645

New York, June 5.—Structural demand in the local market is still restricted, with some interest, looking for no great improvement for at least a month or six weeks. It is likely that the labor situation here in the building trades will become settled soon, but certain depressing seasonal factors will continue in evidence. Nevertheless, there is an unusually large amount of work planned to go ahead this year, and consequently, it is highly possible that business, after labor conditions have been adjusted, will continue above normal. A feature is the heavy amount of municipal work under contemplation. The school work will comprise the biggest amount of tonnage, something like 80,000 tons to be placed this year, according to present schedules. A large tonnage also is involved in subway extensions, elevated railway projects, piers and shops and other buildings.

The largest and most recent municipal award calls for 6200 tons for the Flushing subway extension, bids on which went in some time ago. Between 5000 and 6000 tons is pending for the first section of the Nassau street subway, as noted recently, and specifications for a similar tonnage for the second section are expected out soon. Nothing definite has been announced on the 22,000-ton inquiry of the Jersey Central, but it is belived in some quarters that new bids will be asked.

Prices on shapes continue to hold steadfastly around 2.50c, Pittsburgh, or 2.84c New York with deliveries, as offered by most of the leading mills, at two to three months. Eastern fabricators still are quoting deliveries of about three to three and a half months.

Market Tone More Optimistic

Cleveland, June 5.—Structural lettings continue light, although the general tone of the market is better than in some weeks. The lull existing for the past three or four weeks apparently has about run its course and a resumption of buying is looked for shortly. Some fabricators now are buying plain material for stock against third quarter requirements. Although inquiry is confined mostly to small projects, there are prospective jobs of larger tonnage in sight. No award has been made as yet of the contract for 2200 tons of structural shapes required in the new public library at Cleveland, for which Lundoff-Bicknell Co. is general contractor. It is anticipated that there will be some shading on this because of the large tonnage and long delivery. A further falling in price on the part of the eastern mills is evident, and whereas as high as 3.00c, base mill was done a few weeks ago, and 2.75c, base mill, last week, business for prompt delivery can now be booked at 2.60c to 2.65c, base mill. There is no tendency to shade 2.50c to 2.60c, base Pittsburgh, the general market, although most of the business is going at the former figure.

Shape Backlog Decreasing

Philadelphia, June 5.—Plain shape business was much more active in the past week than in several weeks preceding, but the aggregate tonnage booked was considerably under the total current shipments, so that unfilled tonnage on order books of the mills is shrinking. The prices being quoted, on the current market for both early and forward shipments, is 2.50c, base Pittsburgh.

Heavy Bookings Anticipated

Boston, June 5.—Boston interests have been greatly pleased over the recent passage of the bill to increase the heighth of buildings in the downtown district and many new projects have developed as a result. Steel awards during the past week or ten days for the express purpose of raising the heighth of buildings under construction have reached nearly 4000 tons. Several building projects which have been long contemplated are now definitely going ahead. The Statler hotel project is practically ready for bids. Building interests and fabricators all express a cheerfulness over the prospects of the future market. Prices are unaltered at 2.50c, base Pittsburgh.

Building Operations Still Strong

Chicago, June 5.—Although structural contracts placed during the past week are considerably less than the weekly average for some time past, building operations continue almost unchanged in Chicago and in the West. From the present prospective tonnage a great deal of summer and fall business will be obtained. The Rock Island railroad is redesigning its bridge material for 1923 and will ask further bids soon on the new design. This business originally called for 2380 tons. Plain material is quoted at 2.60c to 2.70c, Chicago mill, the latter applying on a small and uncertain tonnage for early delivery.

Structural Activity on Up Turn

Pittsburgh, June 5.—Structural shape activity appears to have been resumed and to a certain extent the fears of a general slump in building activity so prevalent two or three weeks ago are disappearing. The largest award of the week is that of steel girders, etc., for an elevated line for the Flushing Elevated Co., New York, a total of 6200 tons being let to the McClintic-Marshall Co., which company likewise was awarded two or three smaller jobs involving up to 250 tons. Inquiries calling for 100 to 250 tons are fairly numerous and practically all fabricators have received a number of these during the past week. Allegheny County Engineer, V. R. Covell, stated that efforts are being made so that bids can be advertised for by June 30 on the three local bridges which are to be replaced, namely Sixth, Seventh and Ninth street bridges and thus comply with the war department's order. All three bridges, however, will not require more than 1200 tons. Structural shapes still are quotable at 2.50c, base Pittsburgh, although competition among fabricators is exceedingly keen, particularly where the material to be used is costing them less money on old time contracts.

STRUCTURAL CONTRACTS PLACED

Building awards this week .....10,275 tons
Building awards last week..... 7,442 tons
Building awards two weeks ago....13,744 tons

6200 tons, Flushing subway extension, New York, to McClintic-Marshall Co., the board of estimate just approving the bids submitted a month or so ago.
2000 tons, for 10 55,000-barrel tanks for the Magnolia Petroleum Co., Galveston, Tex., to the Petroleum Iron Works Co., Sharon, Pa.
2000 tons, for 10 55,000-barrel tanks for the Magnolia Petroleum Co., Galveston, Tex., to the United Iron Works, Inc., Kansas City, Mo.
900 tons, three 80,000-barrel tanks for erection in California for an unnamed interest to the Riter-Conley Co.
700 tons, water-softening tanks for the Chesapeake & Ohio railroad, to the Pittsburgh-Des Moines Steel Co.
500 tons, plant addition for Otis Elevator Co., Quincy, Ill., to Kenwood Bridge Co.
350 tons, shop addition for American Locomotive Co., Schenectady, N. Y., to McClintic-Marshall Co.
300 tons, plant for William Provost, Chester, Pa., to Belmont Iron Works.
260 tons, administrative and gymnasium buildings, Carnegie Institute of Technology, Pittsburgh, to the W. N. Kratzer Co.
250 tons, bridges for the Baltimore & Ohio railroad, to Fort Pitt Bridge Works.
250 tons, Illinois Central passenger station, Champlain, Ill., to McClintic-Marshall Co.
225 tons, cooper shop for Standard Oil Co., Cleveland, to McClintic-Marshall Co.
200 tons, power house for Vacuum Oil Co., Olean, N. Y., to Kellogg Structural Steel Co.
200 tons, addition, Rome Wire Company, Buffalo, N. Y., to Kellogg Structural Steel Co.
200 tons, municipal stadium, Terre Haute, Ind., to Almira Iron Works.
175 tons, bridges at Waukon, Iowa, to unknown fabricator.
175 tons, Missouri Pacific railroad, one five panel through riveted truss span, to Virginia Bridge & Iron Co.
170 tons, four small jobs in and near Pittsburgh, to W. N. Kratzer Co.
120 tons, state bridge 3986 at Red Lake Falls, Minn., to American Bridge Co.

STRUCTURAL CONTRACTS PENDING

5000 to 6000 tons, second section of Nassau street subway of the Brooklyn Rapid Transit Co., New York, specifications expected out soon.
1200 tons, three bridges at Pittsburgh, Sixth Seventh and Ninth streets, bids to be advertised for by June 30.
1000 tons, bridgework for Chicago, Burlington & Quincy railroad; bids being taken.
500 tons, Miners bank building, Wilkesbarre, Pa.; bids asked.
450 tons, crane runway, Chicago plant of American Car & Foundry Co.; bids asked, this being in addition to the 300 tons reported last week as pending for a runway at Madison, Ill.
200 tons, high school, Williamsville, N. Y.; bids in.
200 tons, addition to Canisius college, Buffalo, N. Y.; bids in.
200 tons, municipal pier, Roosevelt street, New York; McHard-Barton, low on general contract; bids, however, exceed appropriation.
200 tons, gymnasium, Smith College, Northampton, Mass., bids asked.

Complete Welding Tests

New York, June 5.—A series of tests on some 50 tanks just has been completed by the American Bureau of Welding. The program involved an expenditure of more than $15,000. Test data, conclusions and recommendations to the boiler code committee of the American Society of Mechanical Engineers have been compiled in a report, of which copies may be had from the American Welding Society, 33 West Thirty-ninth street. The report is of special value in view of the fact that efforts had been made for several years to draw up a code for the welding of unfired pressure vessels.

Progress in this direction, however, had been held up because opinions of the best welding experts were not in agreement on many essential points and fundamental scientific knowledge based on test data was not available.

Put 55,784 Cars in Use

Washington, June 5.—In the first half of May the railroads put into service 5633 new freight cars and 308 new locomotives, bringing the total installed since Jan. 1 up to 55,784 freight cars and 1536 locomotives. On May 15 the railroads had on order 113,619 freight cars and 2103 locomotives.

Issue Bonds to Buy Cars

Washington, June 5.—The interstate commerce commission has authorized the Western Maryland railroad to issue $1,500,000 6 per cent equipment trust certificates, as part payment for 2000 rebuilt steel 100,000-pound hopper cars to be purchased from the Dickson Construction & Repair Co.

Hearings at Pittsburgh

Pittsburgh, June 5.—Pittsburgh basing point hearings are scheduled to begin here this week in the federal building. W. W. Corlett, as counsel for the United States Steel Corp., was to arrive today, and it is understood that the hearings will begin immediately since numerous witnesses are ready for examination.

Shows the Steel Needs of Large Customers

Richard Wayland Smith, assistant manager of sales for the Carnegie Steel Co., Illinois Steel Co., and Tennessee Coal Iron & Railroad Co., New York, in testifying at New York May 29 in the Pittsburgh basing point hearings told how he had been compiling trade reports for the Carnegie Steel Co. in the New York territory for 15 years. At the beginning, when the system was instituted about 15 years ago, normal estimates of tonnages consumed were obtained from the customers. In later years, these figures were checked up with the actual orders placed. Mr. Smith was questioned on reports which he made out for the year 1922. The reports showed that the Concrete Steel Co. in June, 1922, had estimated requirements of 100,000 tons, against normal requirements of 120,000 tons. The American Brake Shoe & Foundry Co. had estimated requirements of 8150 tons against the normal requirements of 15,200 tons. Mr. Smith said that about 35 per cent of the Concrete Steel Co.'s normal requirements are drawn from the mills in Chicago; about 50 per cent from the eastern mills and about 50 per cent from the southern mills. The American Brake Shoe & Foundry Co., said Mr. Smith, at present is exceeding normal requirements and already has purchased about 20,000 tons so far this year. Mr. Smith said that the American Car & Foundry Co. last year purchased more than 50 per cent of its requirements from his company. The sheet submitted for the American Car & Foundry Co. set the normal requirements of the latter at 985,300 tons.

Rail Demands Lighter

Although Large Tonnages for Second Half Delivery Are Pending, Little Is Awarded—Car Buying Quiet

RAILROAD TRACK MATERIAL PRICES, PAGE 1645

New York, June 5.—The New York Central railroad has not yet taken official action on the 175,000 tons of rails for second half delivery on which it opened bids May 25. Western mills, however, have been alloted about 60,000 tons. It is not expected that the entire amount called for in the inquiry will be placed. All of the domestic makers quoted on the basis of $43, base mill, for standard open-hearth rails on this inquiry. In addition to the domestic quotations there was one quotation on French and Belgian rails.

Total rail purchases by the Southern Railway for 1923 including the 33,000 tons recent placed are 73,000 tons. The Central Railroad of New Jersey is inquiring for 22,000 tons of rails for the second half.

Current demand for cars is showing little improvement, inquiries as well as orders being small and scattered. Demand for locomotives, however, continues fairly good, an outstanding inquiry calling for 30 electric locomotives for the Great Northern railroad. The Baldwin Locomotive works reports the following orders: One locomotive for the Charcoal Iron Co. of America; one for the Portland & Southwestern; one for the Sierra Railroad of California; one for Lyon, Hill & Co.; one for the Agentine republic; and one switch engine for the Union Terminal Co. The American Locomotive Co. has booked a locomotive for the Washington Run; a rotary snow plow for the Denver & Rio Grande Western; and one switch engine for the Aluminum Co. of America.

April car awards total 2200, the lowest for several months past. Locomotives awarded totaled 173, and passenger cars 120. American Locomotive Co. reports the award of 24 locomotives, including eight switch engines; for the Central Vermont, 20 including five switches for the Grand Trunk Western lines; 4 for the Tennessee Central.

Standard Rail Demand Slumps

Chicago, June 5.—Railroads contiue among the most important buyers of steel. New orders for freight car equipment continue at a low level. A sale of 1000 box cars to the Detroit, Toledo & Ironton railroad stands out as the most important in size for a number of weeks. Purchases of freight cars since the first of the year total 82,547 and pasenger equipment 2477. Activity in the market for standard steel rails is not keeping up, since the New York Central railroad covered for 150,000 tons, more than 60,000 tons of which will be rolled in Chicago mills. Other rail inquiries are comparatively inactive. Light rails continue dull. Railroads are pressing mills to expedite deliveries of standard steel rails and track fastenings.

Book 20 Carloads Weekly

Pittsburgh, June 5.—Representative makers of light rails, each report the receipt of from 20 to 25 carloads weekly, mostly in the way of single carload orders. Occasionally as much as three or five carloads are ordered by one interest or a group of affiliated interests. Most of the present orders are coming from coal mine operators. The price remains unchanged at 2.25c, base Pittsburgh, although the rerollers continue to offer concessions.

A firm market prevails on track accessories. The Pennsylvania and other roads recently have been buying standard spikes and tie plates at the quoted levels. One or two roads continue to negotiate. Some jobbers continue to buy both standard and small spikes in lots of 3000 to 5000 kegs at a time for stocks and report no weakening in market prices. Track bolts on order represent a large aggregate, although new buying is somewhat limited.

CAR ORDERS PLACED

Florida East Coast railroad, 200 flat cars, to American Car & Foundry Co.

New York, New Haven & Hartford, two transformer cars, to Standard Steel Car Co.

Atchison, Topeka & Santa Fe; 50 express refrigerator cars, to General American Car Co.

Detroit, Toledo & Ironton railroad, 1000 box cars to Standard Tank Car Co.

CAR ORDERS PENDING

St. Louis & Southern railroad, 15 cabooses; bids asked.

Charleston & Western Carolina railroad, 50 underframes; bids asked.

Atlantic Coast line, 50 steel underframes for flat cars; bids asked.

Illinois Traction System Co., 100 box cars and 100 coal cars; bids asked.

Missouri Pacific railroad, repairs to 350 freight cars; bids asked.

Chicago, Milwaukee & St. Paul railroad, repairs to 300 freight cars; bids asked.

Pennsylvania Coal Co., 150 mine cars; pending.

South American railway, 500 grain cars; pending.

Gulf Smokeless Coal Co.; 75 mine cars; pending.

Will Move Offices

Effective June 15 offices of the Watson Bros. Steel Co. now located in the Mahoning Bank building will be moved to Hubbard road, Youngstown, O. where the company has taken over a warehouse. The company was established in the Mahoning valley during 1913 as brokers in sheet mill surplus stock, specializing in various grades of sheets used by the stamping trade, galvanized seconds and black cutdowns.

Changes Corporate Name

The Electric Steel Co., 31st and Wood streets, Chicago, has changed its name to the Nugent Steel Castings Co. No change in management or ownership has taken place. Charles Piez is president, W. J. Nugent, vice president and general manager, P. L. Coonley, treasurer and C. A. MacDonald is secretary.

Moves Pipe Mill

One of the pipe mills of the Fretz-Moon Co., Philadelphia, is being moved to Butler, Pa., where the officials plan to have it operating within 30 days. This mill is designed for a production of buttweld pipe in sizes ⅛ to ¾ inch. Present plans of the company call for the erection of two or possibly three additional pipe mills at this point during this year.

The Nonferrous Metals

Copper Firmer but Metal Markets in General Still Quiet Though Consumption Is Heavy

	Copper Electro delivered	Copper Lake delivered	Spot Straits New York	Lead† New York basis	Zinc St. Louis basis	Spot† aluminum	Spot antimony	Nickel spot
May 31....	14.75	15.00	42.75	7.32	6.42½	26.00	7.12½	29.00
June 1....	14.90	15.12½	41.87½	7.72½	6.45	26.00	7.00	29.00
June 4....	14.90	15.25	41.75	7.30	6.42½	26.00	7.00	29.00
June 5....	15.00	15.25	42.00	7.30	6.40	26.00	6.90	29.00

†Outside market quotation.

NEW YORK, June 5.—Nonferrous metal prices halted their decline of recent weeks in the past few days and there has been a partial recovery in some lines. New buying has been slow, but consumers gradually have been showing a little more confidence in the stability of the markets.

Buying in the past two months has been far behind the current consuming rate and as there have been no signs of reduction in manufacturing consumption, renewed buying of metals and metal products on a larger scale has been expected almost momentarily. In general, the slackening in demand and the price reaction of the past two months is regarded as having been beneficial to the metal industries.

Mill Products

Base prices cents per pound, f.o.b. mill

SHEETS	
Copper, hot rolled, 24 oz., min.	24.25
High brass	20.50
Zinc, ga. 9 to 18 (plates ½c less)	9.20
Lead, full sheets (cut ¼c more)	10.75
Aluminum, base 18 ga. and up...	35.40
SEAMLESS TUBES	
High brass	25.50
Copper	27.00
RODS	
High brass, round, ⅝ to 2½ inch	18.75
Naval brass rod	21.00
WIRE	
Copper	19.00 to 19.50
High brass	22.25

Old Metals

Dealers' buying prices cents per pound

HEAVY RED BRASS	
Cleveland	10.00 to 10.50
New York	10.00 to 10.50
Chicago	9.50
HEAVY YELLOW BRASS	
New York	7.00 to 7.50
Chicago	7.00
Cleveland	7.00 to 7.50
ZINC	
New York	4.25
Cleveland	3.25 to 3.75
HEAVY COPPER AND WIRE	
Cleveland	12.50 to 13.00
New York	12.50 to 13.00
Chicago	12.00
RED BRASS TURNINGS	
New York	9.00 to 9.25
Cleveland	9.00 to 9.50
Chicago	9.00
YELLOW BRASS TUBING	
Cleveland	7.00 to 7.50
NO. 1 BRASS ROD TURNINGS	
Cleveland	6.50 to 7.00
New York	7.75 to 8.00
Chicago	8.50
ALUMINUM BORINGS	
Cleveland	11.00 to 13.00

Electrolytic copper sold down to 14.75c, delivered, last week, then recovered to 15c, delivered. Casting copper dropped to 14.50c, then recovered to 14.62½c, refinery. Copper and brass rolled and drawn products prices have not changed this week. European buying has been light and the Ruhr occupation is recognized as the keystone in the continental consumption. Recent signs of approaching understanding in regard to reparations have improved world copper sentiment somewhat.

Zinc sold down to 6.35c, East St. Louis, then recovered to 6.45c, at which prices sales were made June 2. On June 4 some tonnage of June shipment was offering at 6.40c, at which level prices became established. However, unwillingness of ore producers to sell under $40 and inability of smelters to produce zinc for sale at 6.40c from $40 ore are causing something of a market deadlock. Statistically the market continues in strong position, especially as there has been no holding up of shipments, while labor conditions have interefered with production by smelters in some districts.

Lead has held firm at 7.05c, East St. Louis and 7.25c to 7.35c, New York, for June and July shipment. The Smelting company's official contract remains 7.25c, New York. London has remained a more attractive market than New York, with the result that foreign lead is not now being offered here.

Tin prices advanced last week in anticipation of improvement in the world statistical position, due to curtailed Straits shipment and heavy American deliveries. Decrease of about 1000 tons in the visible supply was predicted. However, an increase of about 1000 tons in supplies of Banca and Billiton actually resulted in an increase in the world visible of about 70 tons, so that on the appearance of the figures there was a slight reaction in price. Straits quotations the past week ranged between 41.12½c and 42c, with 99 per cent quoted about ¼ cent under Straits.

Antimony quotations eased off to 7c for spot Chinese in carlots, duty paid; 5c c.i.f. in bond for futures; while early delivery metal, now afloat, could be had a shade under 5c, c.i.f.

The virgin ingot aluminum market has been easy, with sales at premiums of 2c over the Aluminum Co. price where small lots were involved. The market has been quiet. Scrap prices have been weak. The market for 98 to 99 per cent virgin ingot may be quoted nominally 25.50c to 26.50c.

Dismantling Pipe Line

The United States Pipe Line Co., controlled by the Pure Oil Co., has decided to dismantle 400 miles of pipe line between Bradford and Marcus Hook, Pa. The work already has been started at Bradford. The pipe includes 200 miles of 4-inch and 200 miles of 6-inch line pipe originally bought from the Reading Iron Co. It recently withstood a pressure of 1000 pounds to the square inch. The pipe being taken up is being shipped principally to the Pure Oil Co. in Oklahoma and Texas. The United States Pipe Line Co. anticipates selling to the general trade after these orders are filled. The 3-inch line of the company from Franklin to Oil City, Pa., and the three and four-inch lines from Oil City to Titusville and the four and 5-inch lines from Titusville to Warren, have been sold in the ground to the Pure Oil Co., the National Transit Co., H. A. Logan of Warren, Pa., and the Vacuum Oil Co. in Olean, N. Y. B. H. Weber, Chestnut and High streets, Columbus, O., is president of the United States Pipe Line Co.

Form Service Corporation

Surplus Steel Exchange, Inc., New York, is a new service corporation formed for the purpose of presenting an outlet for surplus stock material. Surplus stocks of steel will be listed free of charge by this company and stock lists will be mailed to users of similar material at frequent intervals. A commission will be charged only on sales actually made as the exchange does not propose to purchase material but will act solely in the capacity of agent. The business of the exchange, it is expected, will be built up largely on the large quantities of steel which at all times lie idle in the storerooms of manufacturers who for lack of organization or knowledge of possible buyers do not make any effort to reduce inventory or make way for new material from the steel mills. The officers of the new company are, President, Robert D. McCarter; vice president, George E. Dix; treasurer, William L. Cooper; secretary and general manager, Edward Michaud.

To Close Tin Smelter

American Smelting & Refining Co., will close its tin smelter at Perth Amboy, N. J., July 1, owing to inability to get further supplies of Bolivian tin concentrates in competition with English tin smelters. It is understood the only other tin smelter still operating in the United States will close July 31. All five smelters in the United States will thus have been shut down owing to failure of congress to place a tariff upon tin. Last year the tariff clause providing sufficient protection on pig tin to balance the difference in cost of smelting was approved by the house of representatives, but was defeated in the senate. During the war American engineers and metallurgists perfected at the Perth Amboy plant an electrolytic process for refining tin.

May Iron Output Gains Sharply

Production Totals 3,866,386 Tons, an Improvement Over April of 320,078 Tons—Pig Iron in May Made at Rate of 124,722 Tons Per Day —10 Additional Stacks Blown In

ANOTHER high record production was established when during May 3,866,386 gross tons of coke pig iron was produced. This was at a rate of 124,722 tons per day. Not only was the total the highest in history but the average daily output as well. Part of the increased production, of course, was due to the fact that May had 31 days as compared with 30 in April. On the last day of May 321 furnaces were operating, 10 having been made active during the month. The previous highest production on record was during April when the total reached 3,546,308 tons and the daily average was 118,210 tons. The showing made in May again emphasizes the increased capacity and efficiency of present day furnaces, since in August ,1918, when a record number of 371 furnaces were blowing, the production totaled only 3,378,479 tons.

MONTHLY PRODUCTION

	1923	1922	1921
January	3,228,226	1,645,804	2,414,753
February	2,993,918	1,630,180	1,929,394
March	3,523,595	2,035,908	1,594,866
April	3,546,308	2,070,161	1,190,751
May	3,866,386	2,309,348	1,215,272
June		2,362,455	1,064,007
Total 1st half.	17,158,433	12,053,856	9,409,043
July		2,403,030	864,642
August		1,810,655	954,901
September		2,024,008	985,795
October		2,629,655	1,234,450
November		2,846,110	1,414,958
December		3,083,520	1,642,775
Total 2nd half.		14,796,988	7,097,521
Grand total	17,158,433	26,850,844	16,506,564

Compared with the 3,546,308-ton output of April, the May production of 3,866,386 tons represents an increase of 320,078 tons. The average daily production of May was 124,722 tons, an increase of 6512 tons over the 118,210-ton daily rate of the month before. The daily rate of May is approximately 18,000 tons greater than the average daily rate for 1916 when the highest total for a full year was established. Compared with the low point of July, 1921, when pig iron was being made at the rate of 27,892 tons, the May production represents an improvement of 96,830 tons or 348 per cent.

AVERAGE DAILY PRODUCTION

	1923	1922	1921	1920	1919
Jan.	104,136	53,090	77,895	87,172	106,654
Feb.	106,925	58,220	68,906	102,904	105,270
Mar.	113,664	65,674	51,447	108,895	99,614
Apr.	118,210	69,005	39,691	91,754	82,479
May	124,722	74,495	39,202	96,510	67,991
June	.....	78,748	35,466	101,533	70,467
July	.....	77,517	27,892	98,190	78,200
Aug.	.....	58,408	30,802	101,468	88,453
Sep.	.....	67,466	32,857	104,143	82,692
Oct.	.....	84,827	39,821	106,075	60,142
Nov.	.....	94,870	47,165	87,836	80,244
Dec.	.....	99,468	52,992	87,105	84,711
Ave.	113,632	73,563	45,223	99,456	83,910

In May merchant iron totaled 906,220 tons as against 795,558 tons in April, the gain being 110,662 tons. On an average daily basis this output was at the rate of 29,233 tons, an increase of 2715 tons over the 26,518-ton daily rate of the month before. Nonmerchant or steelworks production totaled 2,960,166 tons, which compared with the output in April of 2,750,750 tons was a gain of 209,416 tons. Reduced to a daily basis the nonmerchant production was at the rate of 95,489 tons per day and was 3797 tons better than the 91,692-ton per day rate of the preceding month. From these figures it is evident that increased merchant stack activity played an important part in the showing for the month.

Blast furnaces operating on May 31 totaled 321, this being a gain of 10 over the 311 active on April 30 and was the highest since January, 1919, when 330 were in blast. During the month nine merchant stacks were blown in and two blown out or banked, the net gain being seven stacks. Of the nonmerchant blast furnaces four were blown in and one blown out, the net gain being three. Of the total number of furnaces active on the last day of the month 105 were merchant and 216 were nonmerchant. The corresponding figures for April were 98 merchant and 213 nonmerchant. On May 31 the Steel corporation was operating 115 furnaces as compared with 113 on April 30 and 108 on March 31.

DIVISIONS OF PRODUCTION

1922	Merchant	Non-merchant	Spiegel	Ferromanganese	Other ferro
Jan.	388,322	1,257,482	1,230	5,644	825
Feb.	355,455	1,274,725	4,930	3,618	872
Mar.	390,643	1,645,265	2,095	11,604	1,102
Apl.	375,814	1,694,347	4,211	14,998	828
May	410,404	1,898,944	4,902	15,432	405
June	423,672	1,938,783	4,817	18,254	854
July	441,752	1,961,278	7,176	18,873	1,887
Aug.	343,522	1,467,143	7,925	11,402	976
Sept.	353,604	1,670,404	4,235	10,681	934
Oct.	502,231	2,127,424	12,285	9,193	1,080
Nov.	603,348	2,242,762	4,192	13,232	961
Dec.	668,950	2,414,570	10,591	17,108	989
Tot'l	5,257,717	21,593,127	68,589	150,039	11,713
1923					
Jan.	713,186	2,515,040	12,056	19,358	952
Feb.	708,901	2,285,017	3,657	21,410	759
March	767,219	2,756,376	13,832	20,730	336
April	795,558	2,750,750	7,440	20,810	670
May	906,220	2,960,166	9,533	19,568	892

Stacks blown in during the month were: In Ohio: McKeefrey, McKeefrey Iron Co.; Ironton, Marting Iron & Steel Co.; Anna, Struthers Furnace Co. In Pennsylvania: Lochiel, E. E. Marshall; Dunbar No. 1, American Manganese Mfg. Co.; Warwick No. 2, Eastern Steel Co. In New York: Susquehanna, Rogers, Brown Iron Co.; Niagara A, Tonawanda Iron Co.; one Lackawanna, Bethlehem Steel Co. In Alabama: City No. 2, Sloss Sheffield Steel & Iron Co. In Illinois: South Work, E. Ellinois tSeel Co.; Joliet No. 1, Illinois Steel Co. In Michigan: Detroit B, M. A. Hanna Co.

Among the stacks blown out during May were: In Pennsylvania: Robesonia, Robesonia Iron Co, Ltd. In Maryland: One Maryland, Bethlehem Steel Co. In Tennessee: Cumberland, Warner Iron Co.

MAY PIG IRON

	No. of stacks	No. in blast last day of month May	No. in blast last day of month April	Total tonnage made Merchant	Total tonnage made Nonmerchant	Totals May	Totals April
Pennsylvania	155	122	120	249,271	1,190,628	1,439,899	1,335,289
Ohio	80	68	65	170,951	709,402	880,353	828,515
Alabama	43	28	27	143,394	103,213	246,607	238,231
Virginia	19	6	6	26,514	.....	26,514	21,452
New York	26	23	20	119,687	143,971	263,658	232,553
New Jersey	4	2	2	24,605	.....	24,605	18,758
Illinois	26	23	21	65,398	307,260	372,658	315,107
Colorado	5	3	3	38,825	366,759	405,584	365,505
Indiana	16	16	16				
Maryland	6	5	6				
Wisconsin	6	4	4				
Kentucky	7	3	3	27,985	60,239	88,224	86,653
West Virginia	5	4	4				
Tennessee	14	7	8				
Washington	1	0	0				
Georgia	2	0	0	27,423	60,868	88,291	75,325
Texas	1	0	0				
Minnesota	3	3	3				
Michigan	4	4	3				
Missouri	1	0	0				
Spiegel and ferro— All states	..	..	..	12,167	17,826	29,993	28,920
Totals	424	321	311	906,220	2,960,166	3,866,386	3,546,308

Analyze Automotive Steel Demand

Producers of Steel and Steel Products Point Out Buying Errors of Automobile Builders —Anxiety To Protect Selves Leads to Bidding Up of Prices—Builders Invariably in Market at Same Time

BY A. H. CHAMBERLAIN

COMMENTS on the steel market usually involve some remarks as to the demands from motorcar and truck buyers and other manufacturers whose products are directly or indirectly related to the automotive industry. It is noteworthy that large consumers of steel in automobile porduction are almost always in the mraket at the same time, and in a period of short supply price with them is a secondary consideration. Their anxiety to protect themselves often leads to bidding up the market, with rather serious effects on jobbers and other buyers of merchant steel who must make forward commitments to prepare for the requirements of their general trade.

The writer recently addressed a letter to a large number of the leading steel mills and manufacturers of steel products consumed by the automobile trade, asking for definite information and such comments as might be illuminating in considering the subject. The general manager of sales of one of the most important factors producing sheets, writes as follows:

"The automotive industry as a consumer of steel products is becoming increasingly important. In the Jan. 4 issue of IRON TRADE REVIEW you will find a statement that approximately 29 per cent of the sheet tonnage produced in 1922 was consumed in the automotive industry. We believe these figures are fairly accurate, and it is our opinion that this industry has a very considerable influence in advancing markets of steel.

"Even the largest manufacturers of pleasure cars postpone buying of their raw materials for too long a period. For instance, this year, after the very satisfactory record made in 1922, there was no particular interest evinced in the sheet market by buyers for automobile concerns until March, and then a wild scramble for tonnage commenced, which undoubtedly had its influence upon prices.

"We have not hesitated to criticize in a friendly way the practice of automotive executives on confining their purchases to a period of six or seven months of the year. We have pointed out to them that no great manufacturing concern can transact business on a satisfactory basis without being well provided with stock; whether this should be for a two, three or four-months' period depends upon the character of the business. We believe the larger interests in the automotive industry will soon be forced to purchase sheets and other steel products in the fall of the year, giving specifications which may be executed during the winter months.

"The automotive parts makers are evidently unable to protect themselves by purchases of sheets, bars or whatever item may be required, until they have received final specifications from the automobile dealers and frequently these do not arrive until the eleventh hour. Then the utmost effort is required to obtain prompt delivery, offers of premiums for early shipments begin, and this leads to other practices which should be avoided.

"A very few of our largest customers in the automotive industry are co-operating with us, to the extent of giving us specifications early in the year, and these interests have had a very satisfactory demonstration of the benefits accruing from such practice. It may never be possible to spread the business of the automotive industry over a 12, or even a 10-month period, but if this cannot be accomplished, then we may expect these sudden fluctuations in markets."

Estimates as to the percentage of the country's steel consumed in the automotive industry do not vary as much as might be expected. One large mill says it has figures that it regards as authorative indicating that the industry is now absorbing about 35 per cent of the output of sheets. The sales manager of another large mill sends the following:

"Many people seem to have gained the impression that the automobile manufacturer and the manufacturer of automobile accessories bid up prices, but this has never been our experience. The buyers in this line of trade are just as shrewd and drive just as hard a bargain as the steel jobbers. What they have demanded, however, is quality and in many instances are willing to pay an extra price for the higher grades of steel that are necessary in the production of automobiles.

"Statistics show that men of modest means are by far the largest buyers of automobiles, and the small merchants and farmers are the largest buyers of trucks. Therefore, it is my opinion, so long as general business remains good, we may look for a heavy demand for automobiles. I am firmly of the opinion that the automobile industry is one of the barometers of trade, particularly so far as bar steel and sheets are concerned; and it is well to keep this in mind in determining when it is advisable for the jobber to add to and when to decrease his stocks of these commodities."

The following is from a letter from John A. Topping, chairman of the Republic Iron & Steel Co.:

"As to what would be the effect upon the steel trade in general of any let-up in demand from the automotive trade, I would express the opinion that it would not have any material effect, because the total amount consumed being only 10 per cent, the reduction in total amount (even though the automotive trade was reduced to a 50 per cent operating basis) would be approximately 5 per cent. As against possible reduction from the automotive trade, we look for materially increased consumption from the agricultural implement trade and we do not expect to see any material change in the railroad requirements during this year."

The president of a mill which is one of the largest producers of cold-finished material writes as follows:

"If this year's production reaches 3,000,000 cars, the automobile industry will consume approximately 15 per cent of the total ingot production estimated at 40,000,000 tons, and as a tonnage factor will be second only to the requirements of the railroads and building trades, both of which, during the past six months, have reached new high levels. It is estimated that the automobile industry consumes about 60 per cent of the production of the cold-finished steel bar industry and from 35 to 50 per cent of the cold-rolled strip steel industry. The extent to which this business has influenced the advancing steel market during the past six or eight months can, in my opinion, be measured only by its importance as a tonnage consumer."

Another manufacturer of cold-drawn material writes:

"It would seem to us that the present rate of automative buying would continue during the rest of the year and while it has been hinted that the industry would suffer a depression during the third or fourth quarter, it seems that the demand for cars is so high that it will run far beyond the pessimistic prophesy. This is starting the wheels of many other factories. The machine tool industry appears to be getting active. Our local problems are to secure sufficient hot-rolled material to fill the orders we have booked, and coupled with this is a scarcity of labor. There has recently been a movement to stay the prices of scrap iron. This may in a measure prevent abnormal costs of iron and steel products if it is recognized by all manufacturers."

A leading tool manufacturer writes:

"We expect that the demand from the automobile manufacturers may decrease slowly until fall and then the improvement will have to depend upon conditions which will govern the production plans for the next season. It is our belief that most automobile manufacturers are operating on as low an inventory as possible and therefore their purchases will diminish only as their business diminishes and likewise will begin to increase as their new plans are made for new production."

Abstract of a paper read at the annual convention of the American Iron, Steel and Heavy Hardware association, Chicago, May 15-17. The author is secretary of the association.

European Pig Iron Prices Cut

Possibility of More Sales to American Consumers Reopened, with French and Belgian Offers Down to $25, f.o.b.—Continental Steel Also Quoted at Lower Figures in England—Reparations Coke Reduced in France

Iron Trade Review Staff Cable

European Headquarters,
IRON TRADE REVIEW,
2-3 Caxton House, Westminster, S. W.1

LONDON, June 4.—Belgian and French foundry iron is available at $25 f.o.b. and this price reopens the possibility of new exportations to the United States. Prices of British as well as continental pig irons are lower, but there is virtually no buyng except from the British West Coast furnaces which have booked good tonnages for the third quarter at 5 shillings ($1.15) under prices for the second quarter. Buying of steel products is light although the mills are well occupied. The general expectation of an early resumption of negotiations on the question of German reparations is addng to the hesitancy noted in European markets.

Germany is offering some competition, especially in pipe. The correspondent of IRON TRADE REVIEW at Dusseldorf wires that comparatively little steel is being shipped from the Ruhr district, despite the recent modification of the German restrictions against such shipments. A further decline in the value of the mark and communist riots in Germany have added to the confusion, although the riots have been suppressed. Wages of German miners and steelworkers have been advanced 10,000 marks (15 cents) per day.

The French correspondent of IRON TRADE REVIEW wires from Paris that the price of reparations coke has been reduced 18 francs ($1.15), the first reduction to be made this year. Pig iron production in France is 65 per cent of what it was before the Ruhr occupation. Schneider & Co. has sold a considerable tonnage of billets to English consumers at £6 10s ($30.09) f.o.b.

Belgian billets are offered in London at £6 2s 6d ($28.36); bars at £7 17s 6d ($36.45); and French wire rods at £10 ($46.30), f.o.b. Considerable steel from the Saar district is appearing on the market owing to the inability of the Germans to ship from the Ruhr. The price of melting scrap in England has fallen to £4 ($18.52).

Changes in British prices within the week bring the following products to the levels as quoted: Wire rods £12 ($55.56); home bars £10 ($46.30); export bars £9 10s ($41.67); home black sheets £12 10s ($57.88); export black sheets £12 ($55.56); galvanized sheets £19 ($87.97); rails for export £9 10s ($43.99); East coast hematite and Middlesbrough No. 3 foundry iron £6 ($27.78); Middlesbrough basic £5 15s ($26.62); Derbyshire No. 3 foundry iron £5 7s 6d ($24.89); Northamptonshire and Stagordshire No. 3 iron £5 5s ($24.31); No. 3 Scotch foundry iron £5 10s ($25.47); home furnace coke £1 8s ($6.48); export furnace and foundry coke £3 2s 6d ($14.47).

Sterling exchange is figured on the basis of $4.63.

British Prices Are Showing More Firmness

European Staff Special

Office of IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,

BIRMINGHAM, Eng., May 24.—Consumers have abandoned their idea of a slump in prices as anticipated a few weeks ago. The steady rise in the value of steel shares is one of the signs of public confidence. Price reductions are practically limited to semifinished steel and rerolled products, which invariably follow fluctuations in billet values. These have receded a little during the holiday week, Belgian billets now being obtainable at £8 ($36.96) delivered. Finished steel is being offered to a small extent, one quotation being £7 17s 6d ($36.78) Antwerp, equal to £9 2s 6d ($42.15) delivered in the Midlands. Belgian steel is being bought to an increasing extent by international merchants, some of those in Birmingham shipping the material direct from Antwerp to eastern, South America and other markets. No. 3 Belgian iron has been reduced to £9 ($41.58) delivered, a drop of 5 shillings ($1.15) in a week, but the effect of this is restricted to the Midlands, and as the nut and bolt trade is quiet no large tonnages on this account are coming in.

Sterling—$4.62

It cannot be said that the large steel works are showing signs of weakness. In Sheffield the basic plants are working full time and specifications are heavier than they were a fortnight ago. There is considerable pressure for delivery. Somewhat belated statistics have been published as to the March production of steel ingots and castings in the Sheffield district, the amount being 119,000 tons, representing an increase over February of 22,000 tons, and as compared with March, 1922 an increase of 77,000 tons. Of the total, 61,000 tons was basic and 48,000 tons acid quality. The March production exceeded the prewar average, although not surpassing expectations. Other districts do not show as good a record, complaints being rather numerous in the west of Scotland where the boilermakers' strike has been affecting shipyard production. In South Wales the recent cut in semifinished prices may be taken as indicating a growing need for new business. Ship plates in that area are quoted at £10 ($46.20) for export, but the figure would be shaded for desirable specifications, and sections are around £9 15s ($45.04).

In the Midlands the steelmakers still are quoting £10 5s ($47.35) for joists and sections and decline to make any concessions. The local constructional engineers say that steel can be bought in Scotland at least 5 shillings ($1.15) lower. No general reduction has been declared, and as most steelworks can see themselves safely into July they are holding to present quotations.

Steel scrap prices are not on a business basis and consumers demand deliveries at about £4 ($18.48), whereas large sellers quote £4 5s ($19.63),

Current Iron and Steel Prices of Europe

Last Reported Prices Converted into Dollars at Rates of Exchange, June 4

British Market

Home Market Prices. Gross Tons at Works or Furnace

Corrected to Date by Cable

	$	£ s d
SEMIFINISHED STEEL		
Billets, soft steel	37.04	8 0 0
Sheet bars	37.04	8 0 0
Wire rods	55.56	12 0 0
FINISHED STEEL		
Steel bars, England, ¾ to 3-inch	46.30	10 0 0
Steel bars, England, ¾ to 3-inch, for export	41.67	9 10 0
Plates, ship, bridge and tank, England	42.83	9 5 0
Plates, ship, bridge and tank, Scotland	42.83	9 5 0
Beams, England	43.99	9 10 0
Beams, Scotland	43.99	9 10 0
Sheets, black, 24 gage	57.88	12 10 0
Sheets, black, 24 gage, for export	55.56	12 0 0
Sheets, galvanized, 24 gage	87.97	19 0 0
Rails, 60 pounds and over	46.30	10 0 0
Rails, 60 pounds and over, for export	43.99	9 10 0
Tin plate, base box, 108 pounds	5.32	1 3 0
Steel hoops	55.56	12 0 0
Steel hoops, for export	54.40	11 15 0
PIG IRON		
Hematite, East Coast, Mixed Numbers	27.78	6 0 0
Hematite, West Coast, Mixed Numbers	28.36	6 2 6
Basic Middlesbrough	26.62	5 15 0
No. 3 foundry, Middlesbrough	27.78	6 0 0
No. 3 foundry, Derby, Leicester, Nottingham	24.89	5 7 6
No. 3 foundry, Northamptonshire	24.31	5 5 0
No. 3 foundry, Staffordshire	24.31	5 5 0
No. 3 foundry, Scotch	25.47	5 10 0
Ferromanganese, 76 to 80 per cent	83.34	18 0 0
Ferromanganese, 76 to 80 per cent, for export	92.60	20 2 0
COKE		
Yorkshire furnace	6.48	1 8 0
Yorkshire furnace, for export	14.47	3 2 6
Yorkshire foundry	6.95	1 10 0
Yorkshire foundry, for export	14.47	3 2 6

Where no separate export prices are given, same quotations apply to domestic and foreign business.

German Market

Prices Last Reported

	$	Marks per metric ton
PIG IRON		
Hematite, Oberhausen	10.97	744,000
Foundry, No. 3, Oberhousen	10.49	711,000
Bessemer Stahleisen, Siegen	11.28	765,000
Foundry, No. 1, Oberhausen	10.53	714,000
Luxemburg foundry		nominal
COKE		
Ruhr furnace	3.17	215,000
Ruhr foundry	3.25	220,000
SEMIFINISHED STEEL		
Billets	13.26	899,000
Sheet bars	16.21	1,099,000
Wire rods	15.74	1,067,000
FINISHED STEEL		
Standard rails	18.49	1,254,000
Merchant bars	18.44	1,250,000
Structural shapes	18.28	1,239,000
Ship plates	20.78	1,409,000
Medium plates, 3 to 5 millimeters	23.35	1,583,000
Sheets, below 3 millimeters	26.80	1,817,000
Tin plate		nominal
Plain wire	19.68	1,334,000
Bands and strips	22.26	1,509,000
Sheets below 1 millimeter	29.07	1,971,000

All prices are f.o.b. furnace or mill.

French Market

Prices Last Reported

	$	Francs per metric ton (2205 lbs.)
PIG IRON		
Hematite, Lorraine	31.73	495
Basic bessemer, Lorraine	28.52	445
Foundry, Longwy, No. 3, sand-cast	27.88	435
Foundry, Longwy, No. 3, chill-cast	28.52	445
Ferromanganese, 76 to 80 per cent	99.36	1,550
COKE		
French furnace	8.65	135
German furnace, f.o.b. frontier*	12.69	198
German furnace, f.o.b. frontier**	19.87	310
French foundry	9.29	145
SEMIFINISHED STEEL		
Blooms	33.97	530
Billets	36.54	570
Sheet bars	44.87	700
FINISHED STEEL		
Standard rails	35.26	550
Merchant bars	44.87	700
Angles	42.70	660
Normal beams and profiles	42.70	660
Plates, ship and tank, 10 millimeters and thicker	49.36	770
Plates, bridge and tank, 5 to 10 millimeters	50.64	790
Sheets, black, 3 millimeters	53.20	830
Sheets, blue annealed, 2 millimeters	57.05	890
Shafting, cold-drawn, 40 to 60 millimeters	89.74	1,400
Bars, 2 per cent nickel steel	141.02	2,200

All prices are f.o.b. furnace or works.
*Up to 38 per cent of normal requirements.
**Over 38 per cent of normal requirements.

Belgian Market

Prices Last Reported

	$	Francs per metric ton (2205 lbs.)
PIG IRON		
Basic bessemer, Belgian	21.66	390
Basic open-hearth, Belgian	30.27	545
Gray forge, Belgian	15.00	270
Foundry, No. 3, Belgian	25.83	465
Foundry, No. 3, Luxemburg	27.22	490
Foundry, No. 3, Lorraine	27.22	490
SEMIFINISHED STEEL		
Blooms	28.33	510
Billets	30.55	550
Sheet bars	31.66	570
Wire rods	41.66	750
FINISHED MATERIAL		
Standard rails	40.27	725
Merchant bars	33.89	610
Normal beams and profiles	32.77	590
Plates, 5 millimeters and thicker	37.50	675
Sheets, black, 3 millimeters	40.27	725
Sheets, galvanized, 1 millimeter	99.99	1,800
Plain wire	66.66	1,200
Galvanized wire	73.60	1,325
Wire nails	69.44	1,250

All prices are f.o.b. furnace or works.

works. No scrap is being bought except for urgent needs.

Pig iron prices do not show weakness. A slight reduction was made a week or two ago in Middlesbrough irons, but No. 3 G.M.B. is fairly firm at £6 3s 6d ($28.52), in spite of the marked reduction in exports. Among the more important brands, Scotch iron appears to be the weakest. In the Midland area the output is so small that makers have been able to maintain their prices for foundry iron practically without change.

The 18 furnaces in the Barrow area have orders sufficient to keep them operating for three months, good tonnages of West coast iron is going to Scotland, South Wales and to the Continent, while a steady sale of ferromanganese is maintained to America.

The element most contributing to firmness is the high price of coke. On the West coast, fuel purchased in the north of England costs £2 8s ($11.08), delivered, and Durham coke for the Middlesbrough furnaces is £2 5s ($10.39).

The reduction in sheet bars has brought down the values of black sheets, some low quotations coming from Scotland where the selling figure is £12 17s 6d ($59.48). Galvanized sheets have by no means developed the same weakness. Prices are maintained at £19 5s ($88.93) to £19 15s ($91.24), and the mills have fair orders to occupy them during the summer.

Tin plate prices are slightly firmer at £1 4s 6d ($5.65). The trade will meet next week to consider whether what is called the stabilization scheme is to be renewed. Under this scheme the makers allow a rebate of 7 shillings 6 pence ($1.73) to the tin plate works provided the selling price of tin plates is uniformly maintained. The majority of the manufacturers appear to favor the scheme. Buying is on a moderate scale, continental business being quiet, although South America is taking a little more interest in the market.

San Francisco Melters Buy Scotch Iron

European Staff Special

London, May 24.—Some small parcels of Scotch foundry iron recently have been sold for delivery to San Francisco and other Pacific coast points. Most of this business was placed at £6 4s f.o.b. Glasgow, equivalent to $28.75 per gross ton. The sea freight from Glasgow to San Francisco, Seattle and Vancouver is now £1 7s 6d or $6.37 a ton with insurance 6 pence ($0.11), making the price $35.23

c.i.f. Pacific coast ports.

This price now could be slightly bettered because of the weakening in the Scotch market last week to £6 2s 6d ($28.40) f.o.b. There is still considerable spread between the f.o.b. price at Glasgow and the furnace price wich now is £5 17 6d or $27.20.

Scotch makers have been exceedingly interested in the report cabled to England by IRON TRADE REVIEW last week announcing the sale of 2500 tons of Indian pig iron at $35 c.i.f. San Francisco. This rather unexpected competition from another part of the British Empire in a territory in which Scotch furnaces always felt they were particularly strong, will be watched closely and the recent shaving of Scotch prices to a competitive basis may not be wholly unconnected with the appearance of the Indian supplies.

A Pacific coast merchant at Vancouver is now inquiring in the British market for 2000 to 3000 tons of bars, for which quotations of about £10 f.o.b. or £12 c.i.f. Vancouver are said to have been made, the latter being equivalent to 2.48c, delivered. With American bars 2.35c, Pittsburgh, and the freight to the Pacific coast of 72 cents per 100 pounds from Pittsburgh and 50 cents from Chicago, the opportunity for effective competition against British mills is not exceptionally bright.

French See End of Ruhr Coke Supply

European Staff Special

Office of IRON TRADE REVIEW,
224 Rue de Rivoli,

PARIS, May 24.—The iron and steel market has become completely disorganized. French industry is passing through a difficult period due to the uncertainty as to what will be the outcome of the Ruhr occupation. The high levels prices have attained, are depressing business, as it is believed the present situation is only temporary, and immediately the cause is removed there will be a rapid adjustment downward. Consumers have reduced their purchases to the minimum.

The fuel situation is at the bottom of the whole trouble. Blast furnace operators in the Ardennes, Moselle and Lorraine are not receiving coke in sufficient quantity to operate economically. Moreover, imported coke is being used which is very expensive when the depreciated value of the franc, the duty, and high transportation costs are considered.

French troops are busily occupied removing the stocks of coke which have been requisitioned in the Ruhr, but average daily shipments are only 5000 to 6000 tons as compared with 12,000 to 15,000 tons prior to the occupation. To make matters worse the French ministry has just instructed the metallurgical industry that one-third of all Ruhr coke received must be put into stock and held as a reserve in case of emergency. This

Franc—$0.065

would indicate that the government is anticipating a long struggle with the Germans, in whcih case the piles of coke which have accumulated in the Ruhr will have disappeared long before any agreement is reached. The Germans have reduced the production of coke in the Ruhr until the present output is just sufficient to ensure deliveries of essential supplies to Italy, Switzerland and Holland, and for the internal requirements of the Ruhr and the Rhineland. If the French allow this form of passive resistance to persist, all coke stocks will be exhausted by September.

Pig iron production is slowly increasing. Prices are steady. Chill-cast No. 3 is being offered for June delivery around 455 francs ($29.55). There is a tendency toward lower prices as orders for July shipment can be placed at 440 francs ($27.70). Hematite iron which was quoted a few weeks ago at 580 francs ($36.55) has moved down to 500 francs ($32.50).

Prompt delivery is now being offered on finished steel products. The mills have carefully avoided heavy commitments since the occupation of the Ruhr, with the result that unfilled tonnage shows a pronounced decrease. Structural shapes are quoted at 680 france ($44.20) but the mills will go lower on desirable orders. Plates can be had at 800 francs ($52.00). English sheet mills are offering close annealed black sheets, 4/10-millimeter thick at 1480 francs ($96.20). Jobbers are offering merchant bars at 650 francs ($42.25), which in many instances is lower than the mills quote on new business.

The steel market was upset a few days ago by the announcement that the government intended to seize the stocks which have accumulated at the Ruhr mills. However, it has been learned that a total of only 6000 tons of billets and miscellaneous rolled products have been requisitioned. The French minister of public works has formally declared that this is not a part of the program of Ruhr occupation but is to punish certain manufacturers who refused to pay the coal tax and fines which have been imposed by the occupation authorities.

The coal miners' strike in the Saar district has finally been settled on the basis of an advance in wages of from 3 to 5 francs a day. The original demand was for 15 francs but the strike was largely of a political nature, all the miners being Germans and opposed to the French occupation of the Ruhr. The strike began on Feb. 5. Its conclusion will somewhat ease the fuel situation in eastern France, although Saar coal is not very satisfactory for the production of blast furnace coke.

Restrictions on Ore for the Ruhr Lifted

European Special Service

DUSSELDORF, Germany, May 24.—The blockade on the importation of foreign iron ore to the Ruhr has been raised and the duty of 10 per cent ad valorem canceled. The allied authorities also have withdrawn their demand for the production of shipping documents, to which formality the German furnace interests had refused to accede. Taken together with the willingness of the German government to permit exports, under French licenses, of steel ordered before Feb. 20, these events indicate some effort on the part of the contending forces to reach a settlement, in order that business may be resumed. It is not believed in the occupied territory that much progress

Mark—$0.00002

can be made until a general political settlement is effected between the French and German governments.

On account of the recent fall in the value of the mark, the iron and steel market in unoccupied Germany is somewhat more active and prices are advancing. The increases in quotations are not sufficient to compensate for the fall in the value of the currency and further advances are anticipated. No. 3 foundry pig iron f.o.b. Oberhausen is now quoted at 711,000 marks ($15.50) per metric ton, with bessemer iron 765,000 marks ($16.60). Ruhr furnace coke has been advanced to 215,000 marks ($4.70) a ton but this quotation is largely nominal because very little Ruhr fuel remains under German control. The price of such coke as is available is out of proportion to the quotations on pig iron, which is another reason for the strength of the market.

There is no market in Germany at present for Luxemburg foundry pig iron, further importations being impossible. In unoccupied territory scrap is being actively sought and heavy cast iron scrap suitable for blast furnace or cupola charging is quoted at 800,000 marks ($17.40) per ton. Unoccupied Germany is very short of pig iron, semifinished

steel, and fuel, but there is relatively little buying of foreign materials on account of the financial situation. The stocks of pig iron, scrap and fuel which were accumulated before the occupation are becoming exhausted.

The wages of the coal miners have been advanced 40 per cent and railway rates again will be advanced 100 per cent in the near future. Export business is quiet but considerable trading would take place if shipping allowed.

Belgian Prices Continue Downward

European Staff Special

BRUSSELS, May 24.—The Belgian market has been extremely quiet for several days. Consumers are holding back in hope that the bottom has not yet been reached, although prices have been falling steadily for the past six weeks. In certain quarters it is believed that large stocks of iron and steel are being accumulated in the German occupied territory which will eventually be thrown onto the market and cause a break in prices. In view of the lack of demand producers are beginning to feel uneasy as tonnage is needed to keep the mills operating. Prices are being shaded to attract business. Belgian quotations appear rather high compared with those prevailing in other large producing centers. Luxemburg and French northern and eastern mills are making inroads on the Belgian market.

The coke situation is becoming easier. This is largely due to the fact that domestic ovens are operating at 80 per cent of their normal capacity. Only 6000 tons of coke was received from the Ruhr district during April. In 1922, average monthly receipts amounted to 39,000 tons. The price of furnace coke averages around 185 francs ($11.10) per metric ton.

The pig iron market is dull and prices are softening. There is very little demand from the foundries, which are working on a reduced schedule. No. 3 foundry iron is obtainable at 485 francs ($29.10) per metric ton.

Prices of semifinished steel products are sagging and Belgian mills are faced with French competition. Few transactions are noted on merchant bars which are now being offered below 700 francs ($42) per metric ton. Structural shapes are firmer. The plate and sheet department is dull. Even galvanized sheets which were in good demand are now being neglected. The demand for lighter gages is satisfactory. Plates of 5 millimeters are offered at 680 francs ($40.80). Demand for wire products has fallen off.

It is reported that the Societe des Acieries d'Angleur has obtained an order of 12,000 tons of rails for Finland. The Ateliers Metallurgiques de Bruxelles have just booked a large order for the Argentine railway covering rails and track accessories as well as a contract for the construction of 15 bridges.

English buyers have sent out inquiries for a large quantity of ship plates. Belgian mills are figuring closely on this business but due to the severity of Veritas or Lloyds inspection and the small difference between English and continental prices these orders in all probability will go to English manufacturers.

Franc—$0.06

Scrap Still Is Declining

(*Concluded from Page* 1646)

turnings, borings, etc., are unusually large. One large automobile firm has disposed of a liberal supply of turnings and borings direct at a slight advance over the market. The belief is little activity will be seen for the next 45 days. The bulk of the movement now is on old contracts.

Prices Decline Further

Cincinnati, June 5.—Dullness and further declines in prices feature the iron and steel scrap market here. Dealers say it is impossible to do business with the consuming interests. Practically all items have been reduced from 50 cents to $1.50 a ton. The reduction, however, failed to stimulate business. Consumers are well supplied with material for the next 30 or 60 days.

The present slump in prices is due almost entirely to the fact that the recently reported scarcity of scrap was much over estimated. The melt continues heavy and all of the works have orders booked which will keep them busy at present rates of activity for sometime to come. They have been cutting into reserve stocks and it is but the matter of a short time until buying is expected to resume. Outside demand is light and the railroads continue to throw large lists on the market. The Pennsylvania will close a list in a few days aggregating 50,000 tons, while the Big Four and Erie are asking bids on two blind lists. Scrap piles are larger than at any time during the past two years.

Demand Remains Stagnant

St. Louis, June 4.—With the industries virtually out of the market scrap iron and steel demand remains stagnant. The only activity noted is where dealers have contracts expiring and are anxious to get material to deliver. All grades are flat, but rolling mill and steel works varities are particularly dull. The melt has been declining slightly since early May, and all the plants are well stocked, and no change for the better in the market is looked for before the middle of July.

Yard stocks in a number of instances are large. Yardmen are laying off help, one interest having dropped 50 laborers and another 26. The more favorable weather has enabled railroads to handle scrap, and offerings from that source are large. The following lists were before the trade: Big Four, blank list; Cotton Belt, 20 cars; Pennsylvania Southwestern Region, 6000 tons; Chicago & Alton, 400 tons; Chicago, Burlington & Quincy, 5500 tons and a small list by the Wabash.

Rails for rolling are plentiful and the leading consumer is out of the market and will be for some weeks to come. Further cuts were made in dealers' lists, ranging from 50 cents to $2 and affecting nearly all classes of items. Prices, however, are to a great extent nominal. Reports from other centers indicate conditions elsewhere are similar to those here. Dealers complain of an unusual number of rejections by the mills and requests for delayed shipments. The movement from the country has subsided.

Buying Is Limited

Birmingham, Ala., June 4.—The scrap iron and steel market here continues to lag. There is little buying and dealers are manifesting some uneasiness. With considerable tonnage yet to be delivered on old contracts there is more or less activity noted about yards and the force of loaders and scrap assorters is still being maintained. Some of the more optimistic dealers say that as long as the pig iron market keeps moving, there is hope of an early recuperation. A little less stocking is noted and indications are there will be no piling up of old material except in a casual way. All quotations show weakness and in several instances reductions are noted.

Consuming Interest Negligible

Cleveland, June 5.—Iron and steel scrap prices continue to decline as a result of lack of interest on the part of consumers who are taking on few new obligations. Buying is confined to dealers who are seeking to cover contracts on many of which heavy tonnage remains to be sent forward. However, it is expected, in that many users do not have heavy stocks, purchasing on a fairly extensive scale will be witnessed within a short time. In fact June is expected to develop a good buying movement. An interesting recent development is the narrowing of the spread between heavy melting steel and hydraulic compressed sheets due to the fact that use of the latter is preferred by many consumers, the percentage of that grade being increased in steelmaking. Heavy melting steel now is quoted at $19 to $19.50 and hydraulic compressed at $17.75 to $18.25. The valley quotation on heavy melting steel is nominally $22 and hydraulic compressed sheets $20.50 to $21. Reductions have been made throughout the list, steel grades in particular being affected.

Coast Market Less Active

Slight Falling Off in Demand Accredited to Labor Troubles—Expect Quick Improvement—Heavy Building Operations Continue

SEATTLE, June 2.—The iron and steel market in this territory is featureless. Demand continues active although in some lines there has been a slight easing off. This however is believed to be only temporary due in some degree to labor troubles as well as to curtailment of construction because of the rising costs of material. The whole tone of the market is healthy and there is no apprehension as to the future.

Two large projects at Tacoma have been authorized, $2,400,000 in new buildings to be expended by the College of Puget Sound while Annie Wright seminary has begun work on a $600,000 home. Building operations at Astoria, Ore., since the fire which almost wiped out that city last December total $2,041,500. This includes construction for which bids have been called amounting to $966,000. The Port of Seattle contemplates an immigration station to be built for the government at a cost of $250,000.

Pig Iron and Coke

Prices remain firm and stationary. The best grades of British and Scotch coke are being quoted at $40 delivered here, duty paid. After surveying the field local pig iron dealers anticipate no decline in prices this year. Domestic iron is not in position to compete with British iron which is supplying the entire demand in this section. Local foundries are all busy and they are buying pig iron as occasion demands. No Indian iron has been sold here although it is in the San Francisco market. There is no change in the coke situation.

Bars, Plates and Shapes

Jobbers are turning over a large amount of this stock. The Pacific Coast Steel Co. reports conditions unchanged from earlier in the month. Considerable work is on the books and the plant is operating three open-hearth furnaces. Prices are unchanged and firm. The export inquiry is less active. Wallace Equipment Co. has been awarded the contract for the iron and steel required in a garage for the Telephone company to cost $150,000.

Other Finished Material

Jobbers state that practically everything in stock is moving in good volume although the effects of recent labor troubles have resulted in a slight loss of sales as compared with April. Logging and lumbering are getting into full swing again after a brief interruption early this month and are furnishing the bulk of the demand for steel and iron. In the farming sections in Eastern Washington spring planting has been under way so that buying of repair material has not been so brisk as it was in April. There are no features in this market although sheets are not moving as freely. Efforts to adjust the differences between jobbers in Seattle and Tacoma have not been successful and sheets are selling at 50 cents under Portland prices. This cut has not stimulated sales. On blue annealed the prices for 12 and heavier is 4.75c base and for 16 and lighter 5.00c base. Jobbers are closely watching proposed changes in water rates from Atlantic and Gulf ports and will cover their requirements accordingly.

Old Material

Conditions are about the same in this market. There is a slightly less active demand and stocks have been replenished to some extent as dealers have extended their sources of supply. Prices are unchanged. Japanese buyers are still seeking steel scrap but they are unable to compete with domestic consumers except when they find material at a bargain. Trans-Pacific freight rates are making it difficult for the Japanese to compete with local buyers. Foundry operators report continued activity but the industry is being handicapped by a scarcity of skilled labor. Some plants have had to turn down desirable orders as they could not be handled by the forces employed.

Grant Smith & Co., Seattle, have been awarded the contract for grading 50 miles of right of way for the Canadian Pacific railway on the Tuffnell northwesterly branch. The work has been let on a unit basis and the cost is reported to run between $200,000 and $225,000. The work will be handled from the contractor's Calgary office.

Chile Bars Scrap Exports

Washington, June 5.—Activity of European speculators in buying up scrap iron and steel in Chile because of the French occupation of the Ruhr has caused Chile to place an embargo upon exports of scrap, states American Consul Makinson at Valparaiso in a report to the department of commerce. The law prohibiting exports was passed in 1917 but since the war its enforcement has relaxed. Recent purchases, however, have caused the law to be reinvoked. Chile could ship 100,000 tons of scrap in a short time, it is estimated.

Export Battlefield Scrap

Washington, June 5.—American Vice Consul Corcoran at Boulogne-sur-Mer informs the department of commerce that the exportation of scrap metal from the battlefields of France in 1922 was only slightly under the record year of 1921. Nearly all of this metal has been going to England. Shipments of steel scrap in 1922 totaled 34,569 metric tons compared with 37,087 in 1921; of scrap iron 1580 tons in 1922 against 1693 in 1921; of brass and copper scrap 2951 tons in 1922 and 5941 in 1921.

Construction Bulletins To Show Markets

Washington, June 5.—Secretary of Commerce Hoover is putting all the resources of his department behind the proposal of the American Construction council to issue weekly and monthly bulletins concerning the labor and material market. One feature in particular meets with Mr. Hoover's approval; this is that the council will compile the actual needs of contractors so that at stated periods the council can state that in a certain weekly or monthly period, contractors will actually utilize so much structural steel, brick, cement, and other material. Trends will be given which will enable prospective builders to determine the propitious time for proceeding with their projects. Secretary Hoover, however, has not publicly urged the retarding of building since his letter to the President in April recommending that federal construction be delayed.

Seek Ore Tax Rehearing

Duluth, June 5.—Attorneys for the Minnesota iron ore companies have decided to ask the United States Supreme Court for a rehearing of the occupational tax case. Should the court's decision stand the companies must pay $5,000,000, accrued levy, immediately.

The contract for rebuilding the Great Northern railroad ore dock No. 2 has been awarded to Peppard & Fulton, Superior, at $1,000,000. Work is to start in the fall.

Virginia Iron Net Gains

Gross earnings of the Virginia Iron, Coal & Coke Co., Roanoke, Va., for the first quarter of the current year amounted to $351,752 against $65,620 in the same period one year ago. Net earnings of $243,559 compared with a loss of $81,047 in the first quarter of 1922, according to a report made public by President John B. Newton, of the company.

Newark, N. J. foundrymen have advanced molders' wages from 81¼ to 90 cents per hour. The advance was made as a result of the demands of the men, who in some shops threatened to go on strike.

IRON TRADE REVIEW

Registration Applied for

The Authority of Industry National and International

Published Every Thursday by

THE PENTON PUBLISHING CO., CLEVELAND, O.

Member, Audit Bureau of Circulation. Associated Business Papers, Inc., and National Publishers Association

BRANCH OFFICES

BOSTON - - - - - - - - - - - 426 Old South Bldg.
CHICAGO - - - - - - - - - 1147 People's Gas Bldg.
CINCINNATI - - - - - - - - - 504 Edwards Bldg.
NEW YORK - - - - - - 2203-2206 No. 220 Broadway
PITTSBURGH - - - - - - - - 2148-49 Oliver Bldg.
SAN FRANCISCO - - - - - - - 675 Monadnock Bldg.
WASHINGTON - - - - - - - - 84 Home Life Bldg.

FOREIGN OFFICES

BIRMINGHAM, ENG. - - - - - - - Prince's Chambers
LONDON, ENG. - 2-3 Caxton House, Westminster, S. W. 1.
PARIS, FRANCE - - - - - - 23 Rue de la Bienfaisance

Cable Address, IROTRAPEN, London, IROTRAPI, Paris

Subscription, United States, Cuba and Mexico, $6 per year. Canada, $8.50 per year. Great Britain and other countries, £2:0:0 per year.

Entered at the Postoffice at Cleveland as Second Class Matter

Copyright 1923 by The Penton Publishing Co.

IN THIS ISSUE

June 7, 1923

IRON AND STEEL MARKET REVIEW 1641
IRON AND STEEL MARKETS ..... 1642 to 1656
IRON AND STEEL SCRAP PRICE 1645, 1706, 1710, 1714
MAY PIG IRON PRODUCTION 1655
EUROPEAN PIG IRON PRICES CUT 1657
FOREIGN MARKETS ..... 1657 to 1660
GERMAN MARK DROPS TO NEW LEVEL 1664
BUSINESS TREND ..... 1665 to 1668
BUILDS SIX-WAY REVERSING VALVE 1669
CHEMISTRY DEVELOPS METALLURGY 1672
MAKING EFFICIENT PRODUCER GAS 1677
BASIC FACTORS ARE HELD SOUND 1683
PREPARING FOR WAR PRODUCTION 1687
ENGINEERS HOLD MEET IN CANADA 1690
OUTLINES POWER AND PORT DEVELOPMET IN CANADA 1691
IRON AND STEEL IMPORTS GAIN 1694
IRON ORE OUTPUT INCREASED 61 PER CENT 1700
MAY TOOL BUYING CONSERVATIVE 1702
TOOL INQUIRY CONTINUES ACTIVE 1703
CONSTRUCTION AND ENTERPRISE 1706
NEW TRADE PUBLICATIONS 1712

Railroad Car Shortage Vanishes

THE progress made by the railroads in recent months in meeting the transportation requirements of the country will stand as one of the notable achievements of 1923. At the beginning of the year the probability of a paralyzing congestion of traffic was one of the most serious clouds in the outlook. That prospect is now rapidly clearing. In the face of the steadily increasing volume of freight traffic this spring the roads have finally succeeded in wiping out the net car shortage and creating a net surplus.

In the week ended May 19 the roads loaded 991,000 cars. This established a new high record for the year as well as for that week in any previous year. It was only 22,000 cars short of the high water mark of loading reached last autumn. At that time the net shortage of cars reached the unprecedented total of 170,000. Although the freight movement is now running within 3 per cent of the autumn peak the huge mountain of shortage had been converted into a daily average net surplus of more than 2000 cars in the week ended May 23.

This performance represents the attainment of a goal directly aimed at by railroad executives. It is the result of carefully worked out plans involving increased efficiency in handling freight and the addition and repair of equipment. It gives support to the claim of railroad heads that they are now fully prepared to meet the big traffic emergency of the year which will come in the autumn with increased movements of crops, coal and goods. That means that the iron and steel industry may be relieved of the annoying complications of prices and deliveries, which always accompany a serious tie-up of traffic. A glance at the Business Trend charts picturing car loading and car shortages will disclose that in 1920 the net shortage mounted rapidly during the spring, although the volume of freight movements did not attain the level now prevailing until much later in the year. In that year the transportation situation was a dominant factor in the steel market.

Since the first of 1922 the railroads have ordered 252,000 cars, of which 136,000 have been delivered. According to present plans there will be expended this year $676,000,000 for new rolling stock. In addition the roads have authorized an outlay of $432,000,000 for improvement of roadbeds and other betterments, all designed to enhance facilities and expedite the movement of freight. These large outlays have been made possible by the prevailing prosperity of general business which is creating unequalled amounts of transportation needs.

Since the first of the year the volume of car loadings has been 20 per cent more than in the same period last year. It was 10 per cent more than the previous high record for the corresponding period. Large expansion of railroad facilities are required because of their failure to keep pace with the expansion of industry since 1913. It is estimated that industrial productive capacity is now 35 to 40 per cent greater than it was 10 years ago. Railroad facilities have made scarcely any increase.

Agreement in Ruhr Necessary

RECENT developments in respect to the Ruhr make it appear probable from the American viewpoint that a working agreement between the Germans and French cannot be postponed much longer, though such an agreement may be far from a settlement of a character such as believed necessary to insure the peace of the world.

The French correspondent of IRON TRADE REVIEW notes that if the French allow the Germans to persist in their policy of passive resistance, all stocks of coke available to the French will be exhausted by September. More than half of the choice ovens in the Ruhr have been allowed to go cold, and the output of those now active is barely sufficient for the requirements of the iron and steel industry in that district alone.

The shortage of coke in France and Belgium is acute; France now receives only 5000 to 6000 tons

daily from the Ruhr, compared with 12,000 to 15,000 tons before the Ruhr was occupied.

The correspondent observes that "the French iron and steel market has become completely disorganized through the uncertainty as to what will be the outcome of the Ruhr occupation." Business has become depressed to a very serious extent; the French consumers are refusing to buy at prices forced up through the shortage of coke and the cost of imported fuel. They are withholding purchases, confident that with an agreement in the Ruhr controversy, will come an increased supply and easier market conditions.

On the German side, overtures have been made looking to an "armistice" in the program of passive resistance while negotiations with the French proceed. The Germans are showing every evidence of being ready to give up passive resistance and get back to work. German industry likewise is demoralized, her export trade dissipated, her workers demanding payment for their services in gold.

The recent further depreciation of the mark is another force tending to make Germany pursue a conciliatory policy, for without making peace with France there is little hope for her to restore a semblance of stability to her currency. An illustration of how the mark has depreciated is afforded by the fact that sheet bars, quoted in this country around $45, are today priced at more than 1,000,000 marks in Germany, the equivalent of $240,000 based on the normal value of the mark.

It is questionable whether France would obtain results of benefit to itself if it attempted to force a greater volume of production of coke in the Ruhr, rather than to reach an agreement with Germany; both sides under present circumstances have a great deal to lose, France more than Germany, while neither can gain.

The suggestion made by Judge Gary at the annual meeting of the American Iron and Steel institue for reference of the question to a disinterested nation does not appear likely to affect the situation. The play of economic forces probably will force a truce in the not distant future; whether the age-old dispute between the French and Germans will be settled permanently in this generation is problematical.

Iron and Steel Still Supreme

PERIODICALLY some brazen pretender lays claim to the kingship of American industry but it requires only a nominal marshaling of data to expel the usurper and uphold the reign of iron and steel. Now it is the meat-packing industry that is in the van, and all because the 1921 figures of the census bureau list the following branches of industry as the first ten in rank of value of products: meatpacking, $2,200,942,000; petroleum, $1,727,440,000; automobiles, $1,666,140,000; foundries and machine shops, $1,565,527,000; steelworks and rolling mills, $1,481,659,000; cotton goods, $1,279,168,000; bread and bakeries, $1,089,759,000; men's clothing, $933,249,000; lumber and timber, $902,501,000; and boots and shoes, $866,817,000.

Only by splitting the iron and steel industry can it be demoted. The combined value of the products of foundries and machine shops and of steelworks and rolling mills, listed separately in the census, is in itself $3,047,186,000 or $846,244,000 greater than that of the meat-packing industry. If the value of products of blast furnaces and wire and tin plate mills is added the total rises to more than $3,572,800,000. Nor does this take into consideration the vast number of ferrous enterprises not embraced in any of the above classifications, which even in such a lean year as 1921 would have pushed the iron and steel total above $4,000,000,000. And automobiles, ranked third by the census bureau, are at least three-quarters iron and steel. In the civilization of today it is doubtful if iron and steel can ever be rethroned statistically.

Learning from Canada

IN holding its semi-annual meeting in Montreal last week, the American Society of Mechanical Engineers expressed its recognition of the high standard of the engineering profession in Canada. The program, consisting principally of papers dealing with the development of the dominion's land and water resources, was unusually appropriate.

Engineers who attended that meeting, and especially those who visited the hydroelectric and improved waterway projects, must have been impressed with the energy with which the provinces of Quebec and Ontario are striving to harness their abundant natural resources. The work at Chippewa, the Welland canal, the extensive improvements along the St. Lawrence river, and the development of the port of Montreal indicate that the Canadian government has not been backward in launching engineering projects on a liberal scale.

With the Allegheny, Monongahela, Ohio and Mississippi rivers still far from being suitable for inland water transportation, it cannot be said that the opportunity for waterway development in the United States is lacking. As time goes on, economic necessity will compel the construction of a system of inland water transportation, complementary to the rail and highway systems.

Technical skill will not be lacking when this work is undertaken. The country is adequately supplied with engineering talent. What is needed more than mere scientific knowledge is the type of engineer, who, while well grounded in the technic of his profession, is broad enough to grasp the economic and political aspects of a problem. Canada's achievements indicate she has men of this type, or at least that her engineers know how to work in harmony with public officials.

German Marks at New Depths

Percentage of Depreciation Is Now Greater than That of Austrian Crown—New Reparations Offer Predicted—Financial Sentiment Unsettled—Car Shortage Disappears—Farmer Buying Is Large

BY JOHN W. HILL, FINANCIAL EDITOR

LOWER prices for wheat, for cotton and for copper, the fresh break in German marks and lagging stock market values have called attention to the uncertainty which still prevails. On the other hand underlying business sentiment continues to improve. Indications now are that the probable letdown in general activities this summer will be followed by a brisk resumption in the autumn. Basic factors are favorable. Credit is abundant. Consumption is proceeding at unprecendented pace. Inventories are not piling up. Of great importance also, the curtailment of output in some lines should forestall any approaching overproduction. The drop in marks to a level of greater depreciation than the Austrian crown probably is the forerunner of a new reparation offer which may form the basis for ending European chaos.

A potentially unsettling factor in the steel market has been eliminated with the passing of the car shortage, as shown by the Business Trend chart. In 1920, when freight movements were less than now, freight congestion became a dominant market influence. Faith in continued iron and steel activities and good earnings is reflected in the increase in the common share dividend rate by a large independent steel company.

Large employers in various centers report some relief from the extreme labor shortage is now discernible due largely to lessened activities. In this connection it is interesting to note that the net gain in immigration during the nine months ended with March was 307,000 against a net loss of emigrants in the corresponding period one year ago of 126,000. This change in the alien tide reflects prosperity and high wages in this country.

The drop in wheat has called renewed attention to the low purchasing power of farm products in terms of other commodities. As shown by the Business Trend, this is now only 70 per cent of what it was in 1913. Nevertheless the farmer's outlook is described as good and reports of increased sales of automobiles, implements and mail order goods in the agricultural section bespeak good buying. The facts are that farmer prosperity is not evenly spread. It is more pronounced among cotton and wool growers and less evident among wheat and livestock raisers. Last year 2,000,000 people left the farms, with a net loss of 460,000, a fact probably explained by the showing that the average cash return for an average large farm in 1922 was only $717.

Index to Business Trend Charts

THIS ISSUE

Subject	Page
Farmer Purchasing Power	1665
Security Prices	1666
State of Credit	1666
Freight Car Situation	1667
Monthly Alien Migration	1667
Railroad Freight Traffic	1667
Coal Production	1668
Copper Prices	1668
Foreign Exchange	1668
Independent Sheet Situation	1668

REFERENCES

Cotton Consumption	May 3
Dollar Purchasing Power	May 31
Monthly Commodity Prices	May 31
Steel Castings Bookings	May 31
Structural Awards	May 31
Foreign Trade	May 24
Iron and Steel Foreign Trade	May 24
Monthly Coke Output	May 24
Electric Power Production	May 24
Prices and Failures	May 24
Railroad Earnings	May 24
Iron and Steel Price Index	May 24
Aberthaw Index	May 17
Automobile Production	May 17
Bank Clearings	May 17
Building Construction	May 17
Business Index	May 17
Steel Orders	May 17
Wholesale Trade	May 17
Car Orders	May 10
Foundry Pig Iron Market	May 10
Iron and Steel Price Parity	May 10
Monthly Pig Iron Index	May 10
112 Years of Prices	May 3
Building Cost Index	April 26
Monthly Incorporations	April 19
Monthly Ingot Production	April 19
Freight Factor	April 19
Wage Factor	April 19
Wages and Living Cost	April 5
Steel Earnings	Feb. 8
Iron and Steel Production Rate	Feb. 1
Steel Output Per Capita	Feb. 1
Commodity Prices	Jan. 11
U. S. Crop Production	Dec. 28
Long Time Trend of Wages	Aug. 3

The Barometer of Business

WEEKLY COMPARISON

	Last week	Week before	One mo. ago	One year ago	Average 1913
Business failures	268	355	375	407	328
Cash ratio Fed. Res. System	76.1	75.6	75.2	78.0	...
Loan rate, 4-6 Mo. N. Y. (per cent)	5-5¼	5-5¼	5-5¼	4¼	5¼-6
Aver. 25 ind'l shares	$108.54	$109.92	$109.85	$98.80	$58.19
Aver. 25 rail shares	$60.58	$61.38	$61.27	$62.70	$82.95
Aver. 40 bonds	$77.72	$78.06	$77.08	$80.04	$93.00
Car loadings (week ended May 19)	991,797	974,531	937,743	780,953	*862,030
Bank debits 241 cities (000 omitted)	$7,815,493	$9,577,211	$11,050,579	$7,277,744	.....

*1920.

FOREIGN EXCHANGE (Demand)

	Normal	June 4 (close)	Week before	Mo. ago	Yr. ago
Sterling	$4.86	$4.62	$4.62	$4.61	$4.48
Francs	19.3c	6.40c	6.61c	6.61c	9.12c
Lira	19.3c	4.61c	4.78c	4.85c	8.42c
Marks	23.8c	0.0014c	0.0017c	0.0027c	0.36c

MONTHLY COMPARISON

	April	Month before	Year ago	Monthly average 1913
Dodge building awards in 27 states	$358,693,000	$334,000,000	$353,162,000	$71,450,000
Business failures:				
Number	1520	1682	2167	1336
Liabilities	$46,991,941	$48,393,138	$73,058,637	$22,723,000
Exports	$340,970,000	$341,162,000	$329,979,000	$207,000,000
Excess of gold imports	$8,533,235	$5,559,257	$10,664,000	†$630,716
Bureau of Labor Price Index	159	159	143	100
Bradstreet's Price Index	147.8	150.1	126.6	100
Economist's British Price Index	‡4412	4440	4372	2717
Cost of Living Index	159.1	159.2	154.8	100
New incorporations	$1,006,258,000	$500,819,000	$792,373,000	$172,301,000
Railroad net earnings	*$83,568,000	$38,903,000	$83,511,000	$59,900,000

‡May. *March. †Monthly average excess exports.

The Business Trend

June 7, 1923

TRADE TODAY, TOLD BY IRON TRADE REVIEW CHARTS

GENERAL SITUATION—Outlook continues for greater trade activity in Autumn following partly seasonal lull during summer; recent extreme pessimism is receding; increase in dividend by large independent steel company reflects expectation of favorable earnings.

FOREIGN EXCHANGE—Marks fall to new low level; percentage of depreciation now greater than Austrian crown; new reparations offer expected soon.

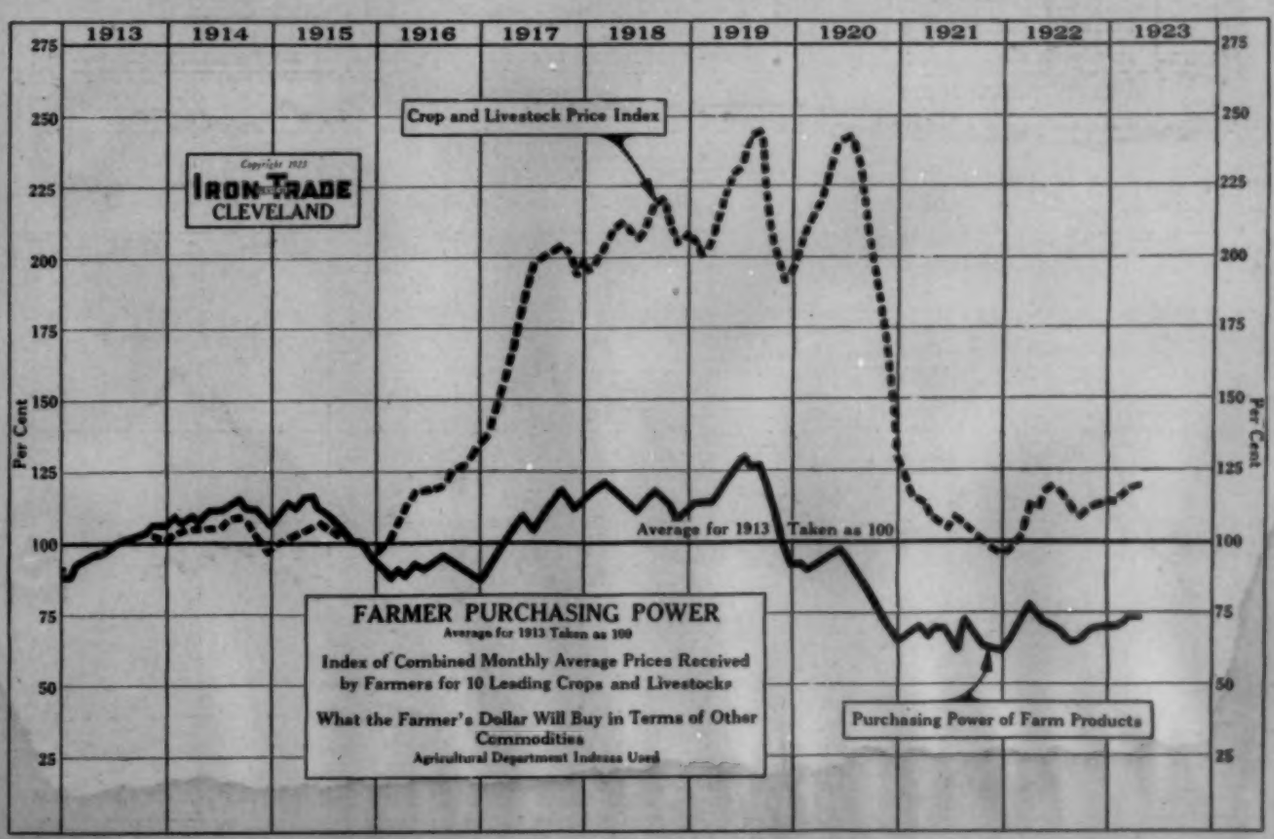
FREIGHT TRAFFIC—Car loadings for week ended Many 19 totaled 991,000; was only 22,000 or 2.5 per cent under last Autumn's peak of 1,014,000 cars; coal ore and coke loading show increase.

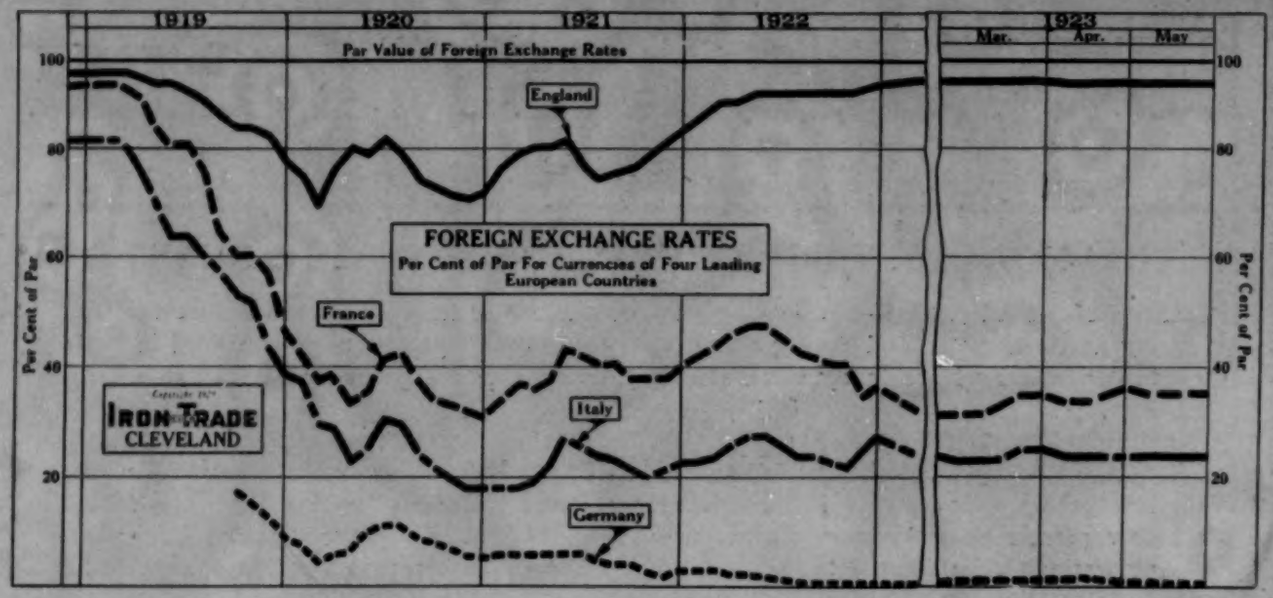
CAR SHORTAGE—In the face of seasonal record breaking freight movements, the car shortage has vanished; in week ended May 23 there was a daily average net surplus of cars of over 2000.

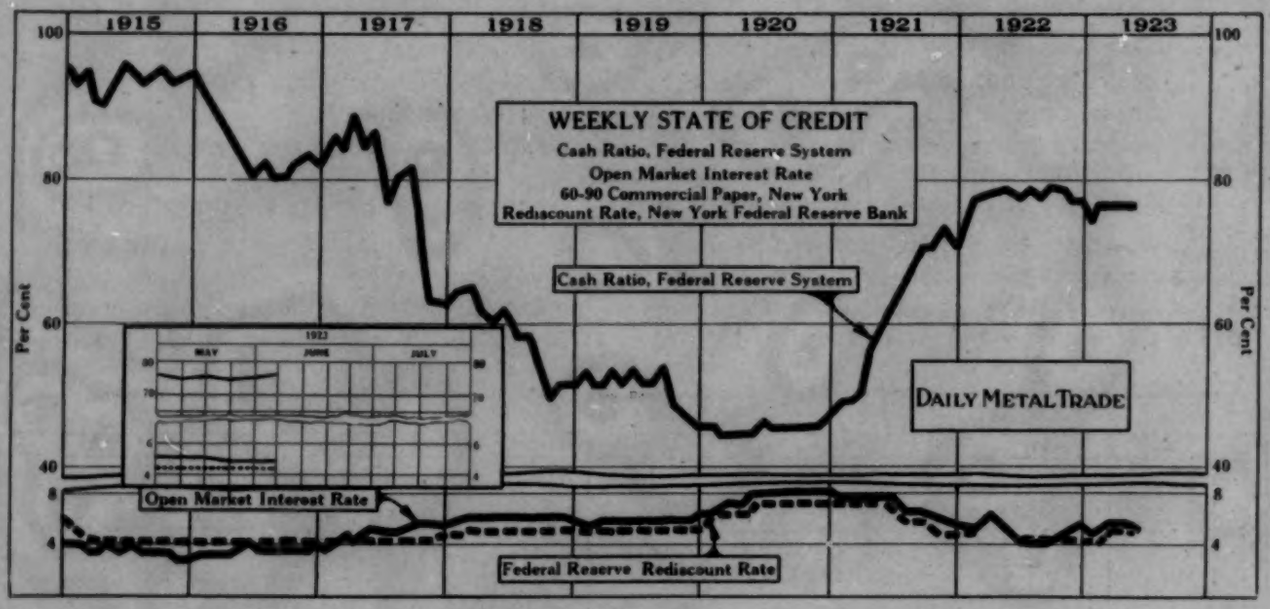
COPPER—Decisive price declines in the metal markets have carried copper back over all the ground gained this year; lower levels attracting more inquiries.

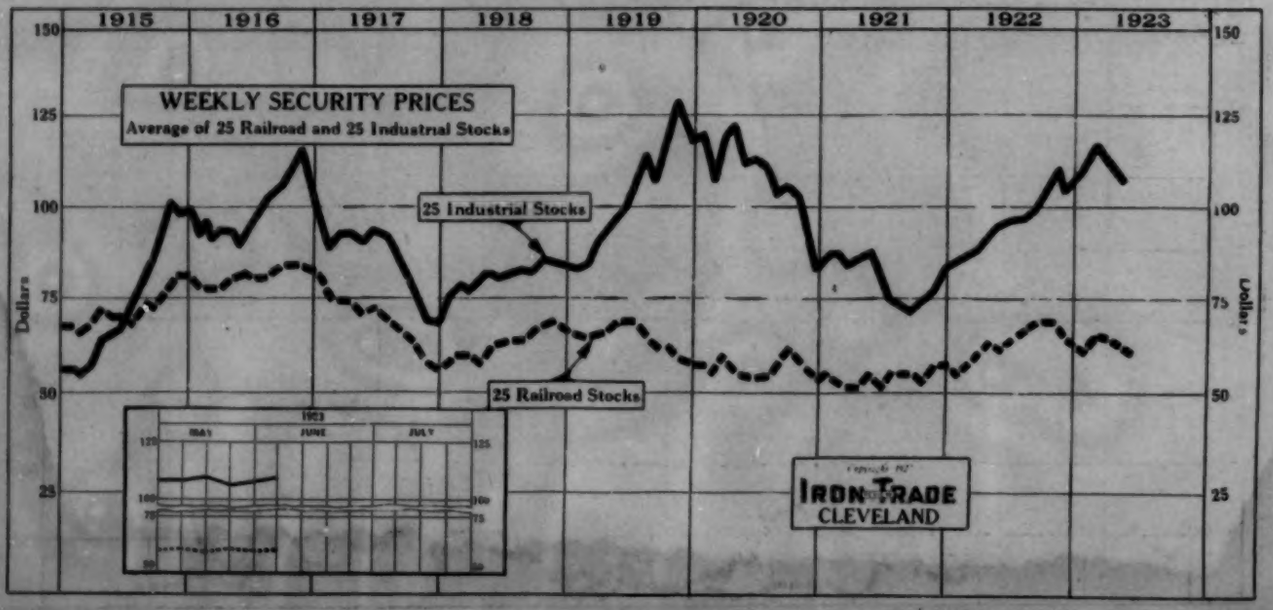
IMMIGRATION—Net gain in immigration in March was 39,278; compares with 27,324 in February and 24,541 in January; year's immigration quota nearly filled; labor shortage less acute.

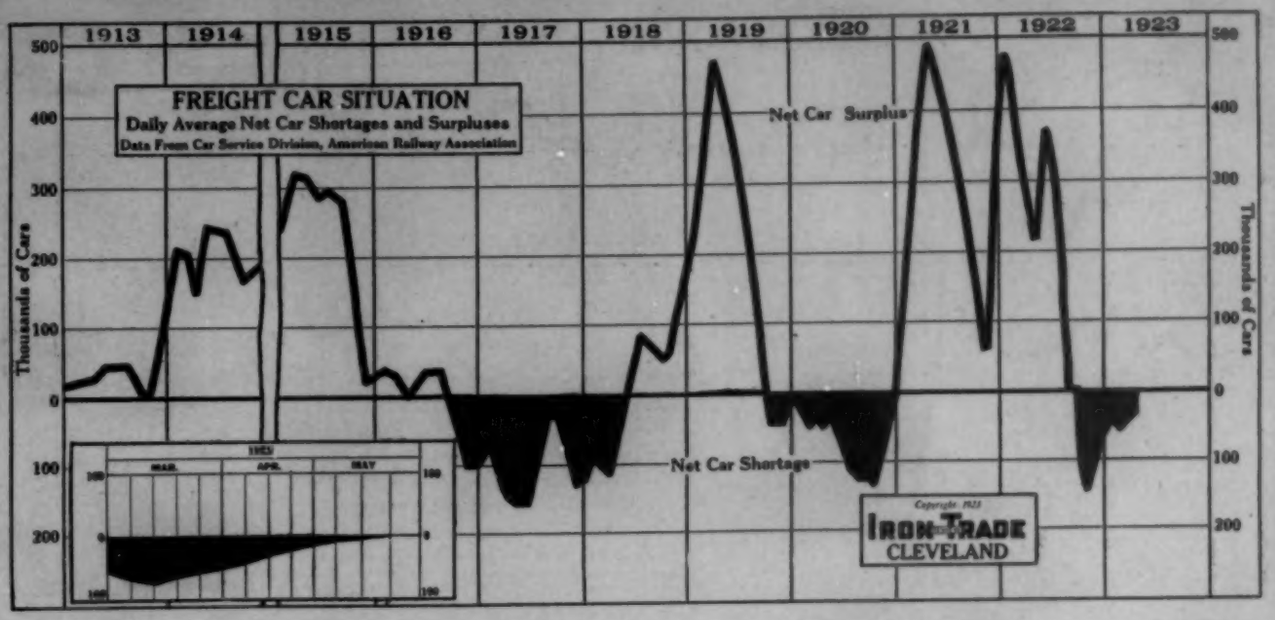
FARMER PURCHASING POWER—Prices of farm crops and livestock 22 per cent above 1913 in April against 20 per cent above in March; purchasing power of products 70 per cent of prewar.

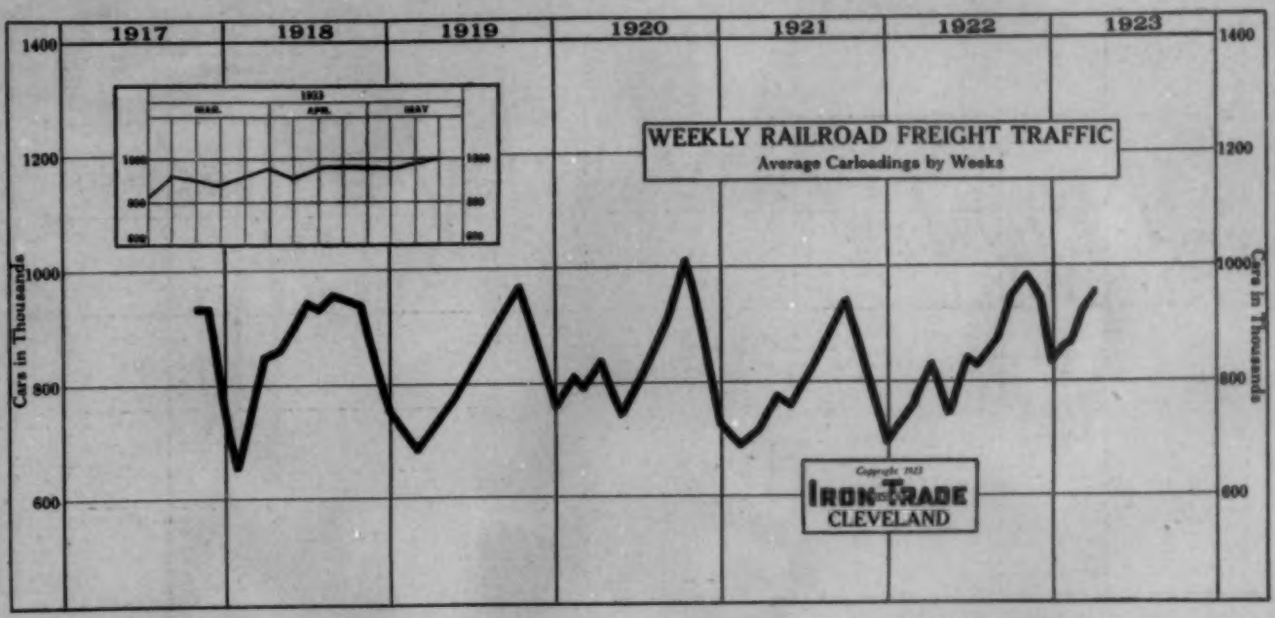


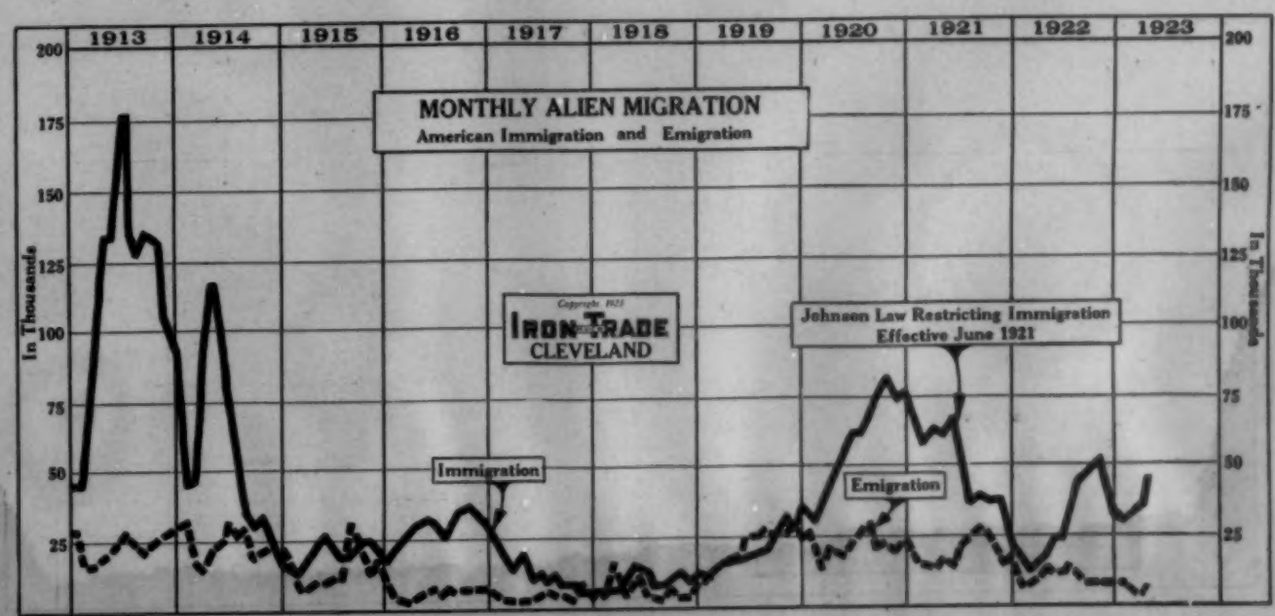

1919
1920
1921
1922
1923
Mar.
Apr.
May
Par Value of Foreign Exchange Rates
England
FOREIGN EXCHANGE RATES
Per Cent of Par For Currencies of Four Leading European Countries
France
Italy
Germany
IRON TRADE
CLEVELAND
Per Cent of Par
100
80
60
40
20

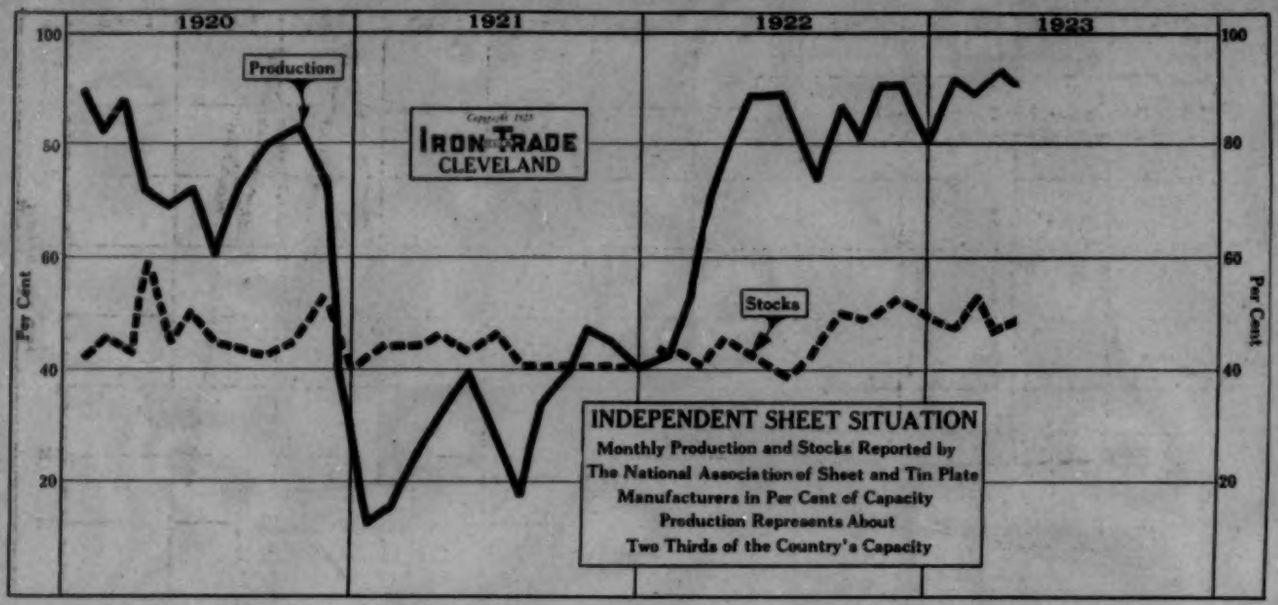

1915
1916
1917
1918
1919
1920
1921
1922
1923
WEEKLY STATE OF CREDIT
Cash Ratio, Federal Reserve System
Open Market Interest Rate
60-90 Commercial Paper, New York
Rediscount Rate, New York Federal Reserve Bank
Cash Ratio, Federal Reserve System
DAILY METAL TRADE
Open Market Interest Rate
Federal Reserve Rediscount Rate
Per Cent
100
80
60
40
8
4

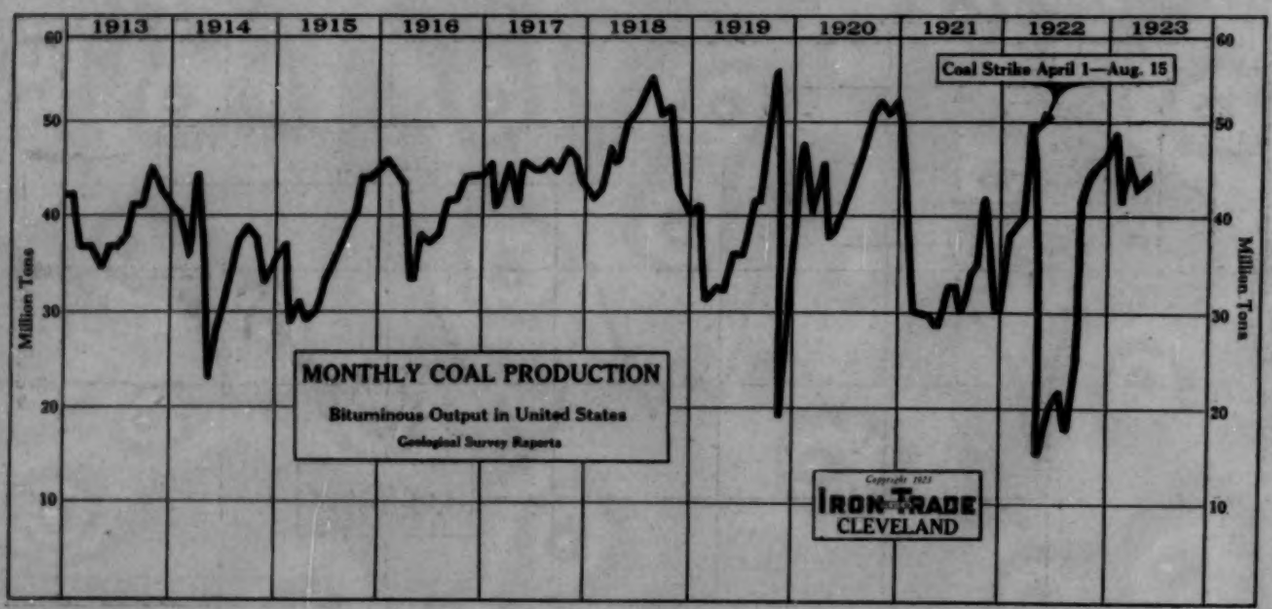

1915
1916
1917
1918
1919
1920
1921
1922
1923
WEEKLY SECURITY PRICES
Average of 25 Railroad and 25 Industrial Stocks
25 Industrial Stocks
25 Railroad Stocks
IRON TRADE
CLEVELAND
Dollars
150
125
100
75
50
25

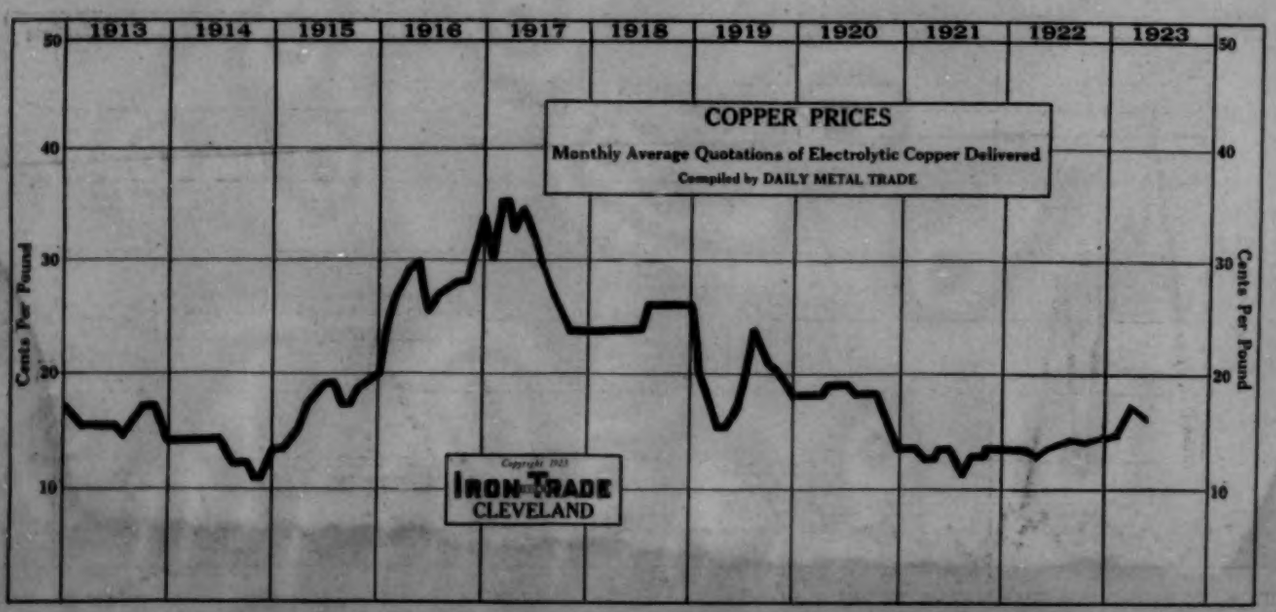

1913
1914
1915
1916
1917
1918
1919
1920
1921
1922
1923
FREIGHT CAR SITUATION
Daily Average Net Car Shortages and Surpluses
Data From Car Service Division, American Railway Association
Net Car Surplus
Net Car Shortage
Thousands of Cars
Thousands of Cars
1923
MAR.
APR.
MAY
Copyright 1923
IRON TRADE
CLEVELAND


1917
1918
1919
1920
1921
1922
1923
WEEKLY RAILROAD FREIGHT TRAFFIC
Average Carloadings by Weeks
Cars in Thousands
Cars in Thousands
1923
MAR.
APR.
MAY
Copyright 1923
IRON TRADE
CLEVELAND


1913
1914
1915
1916
1917
1918
1919
1920
1921
1922
1923
MONTHLY ALIEN MIGRATION
American Immigration and Emigration
In Thousands
In Thousands
Copyright 1923
IRON TRADE
CLEVELAND
Johnson Law Restricting Immigration
Effective June 1921
Immigration
Emigration


1920
1921
1922
1923
100
80
60
40
20
Per Cent
Production
Stocks
Copyright 1923
IRON TRADE
CLEVELAND
INDEPENDENT SHEET SITUATION
Monthly Production and Stocks Reported by
The National Association of Sheet and Tin Plate
Manufacturers in Per Cent of Capacity
Production Represents About
Two Thirds of the Country's Capacity


1913
1914
1915
1916
1917
1918
1919
1920
1921
1922
1923
60
50
40
30
20
10
Million Tons
Coal Strike April 1—Aug. 15
MONTHLY COAL PRODUCTION
Bituminous Output in United States
Geological Survey Reports
Copyright 1923
IRON TRADE
CLEVELAND


1913
1914
1915
1916
1917
1918
1919
1920
1921
1922
1923
50
40
30
20
10
Cents Per Pound
COPPER PRICES
Monthly Average Quotations of Electrolytic Copper Delivered
Compiled by DAILY METAL TRADE
Copyright 1923
IRON TRADE
CLEVELAND

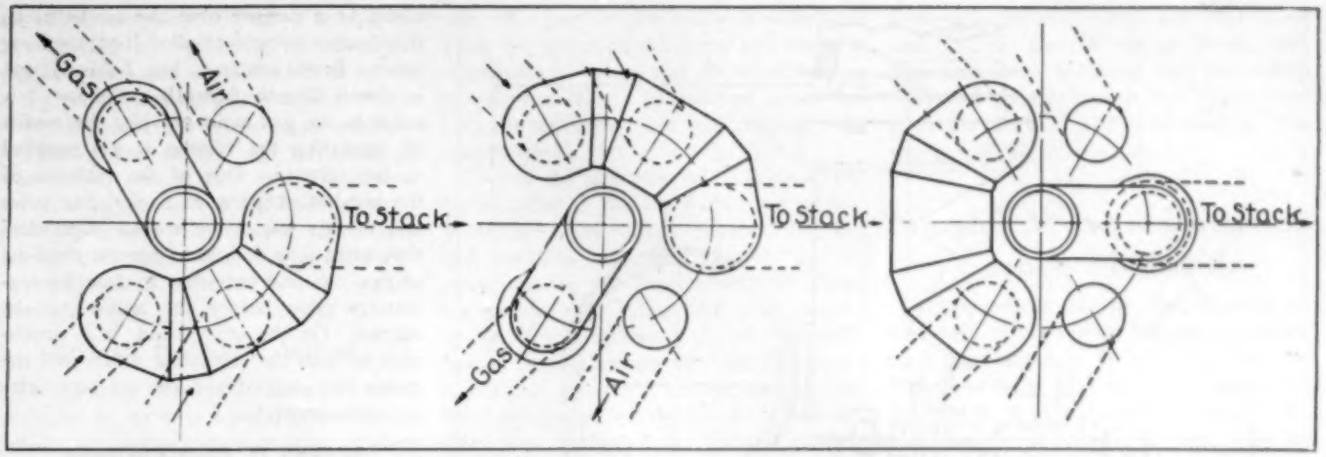


Fig. 1—(Left) Sketch Showing the Valve in One of the Two Operating Positions. (Center) This Sketch Shows the Valve Rotated 120 Degrees Counterclockwise to the Second Operating Position. (Right) This Sketch Shows the Valve Turned by Hand to the Burnout Position

Builds Six-Way Reversing Valve

NECESSITY for periodic reversing of regenerative furnaces, including open hearths, soaking pits and heating furnaces, has resulted in one of the chief difficulties in their operation. To improve efficiency when producer gas is used as the fuel, the gas and air must be preheated before they enter the furnace, an operation which is accomplished by passing the gas and air through brick regenerators previously heated by allowing the products of combustion to pass through them on their way to the stack. Thus, while two regenerators are being used to heat the gas and air the other two are being heated. The periods of reversal usually are of 15 to 30 minutes duration.

Various means of reversing the flow of gas and air are in use, ranging from several manually controlled valves to electrically powered mechanisms effecting the reversal in one operation. One of the most recent developments in mechanical equipment for this purpose is a six-way reversing valve embodying a number of features for quickness and efficiency. Fig. 2 shows a photograph of this valve while Figs. 3 and 4 show sectional and plan views respectively. As shown by these illustrations, the five outlets in the brickwork,

FIG. 2—IN THIS VIEW THE VALVE IS BEING MOVED FROM ONE OPERATING POSITION TO THE OTHER. THE MOTOR AND MECHANISM WHICH ACCOMPLISH THE MOVEMENT ARE SHOWN MOUNTED ON THE PLATFORM BETWEEN THE TWO TUBES

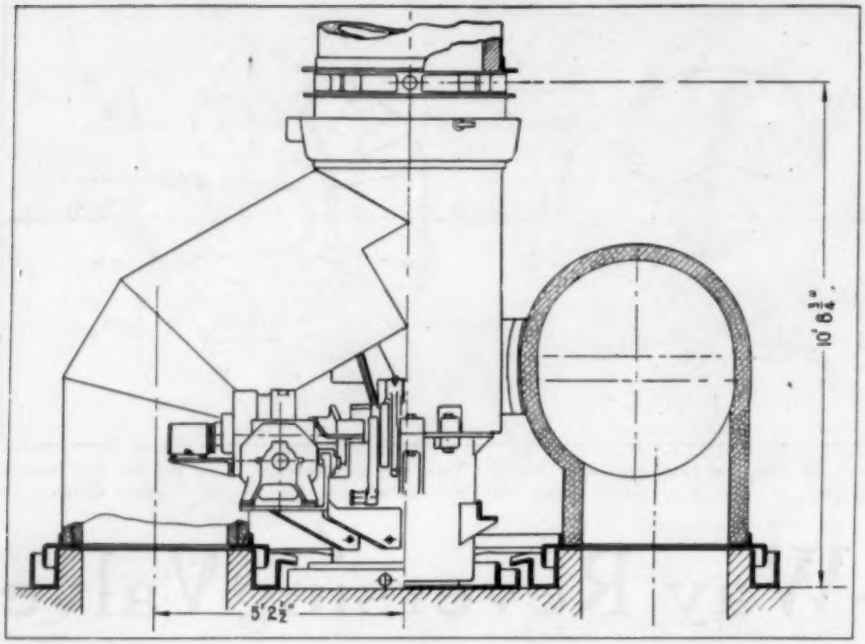


FIG. 3—SIDE ELEVATION OF NEW SIX-WAY REVERSING VALVE SHOWING THE OVERHEAD GAS CONNECTION AND THE CROSS SECTION OF THE TUBE WHICH CONDUCTS THE PRODUCTS OF COMBUSTION TO THE STACK

namely two outlets leading to the air regenerators, two to the gas regenerators and one to the stack, are on a common floor level and are grouped about a common center. The incoming gas main is overhead, its axis passing through the common center of the five outlets below, as shown in Figs. 2 and 3.

The valve proper consists of a pintle casting upon which is mounted a housing supporting a gas tube lined with firebrick and insulating brick, also another tube with three terminals. This second tube is lined with insulating brick to conduct the products of combustion to the stack. These tubes are so mounted that normally the gas tube is connected through a water seal with one of the gas regenerators, while both of the regenerators on the opposite end of the furnace are connected to the stack by the other tube. The volume of air admitted to the air regenerator is regulated by a damper over the air terminal, this damper being controlled from the floor above. In the center of Fig. 2 this damper is shown directly beneath the motor. A valve in the gas main provides the means of regulating the volume of gas supplied to the furnace. One of the features of the installation is that this regulating valve and the six-way valve are so interlocked that when it is desired to reverse the flow of gas, it is first necessary to close the regulating valve before the motor can be started. On the other hand, it is impossible to open the regulating valve until the motor has stopped and the six-way valve is seated properly.

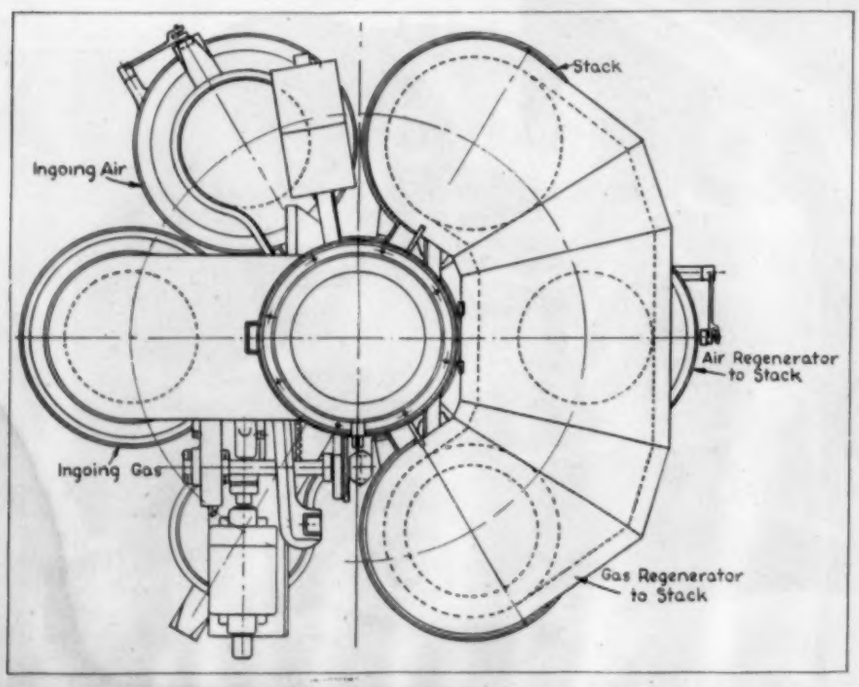


FIG. 4—PLAN VIEW OF THE ABOVE WHICH SHOWS THE FIVE OUTLETS GROUPED ABOUT A COMMON CENTER. THIS VIEW ALSO SHOWS THE METHOD OF MAKING THE GAS CONNECTION AS WELL AS THE OUTGOING CONNECTION TO THE STACK

Weight Is Counterbalanced

For ease in raising the valve and rotating it to the reversed position, the whole weight of the moving parts is supported on a knife bearing in the center of the valve, this in turn resting upon a ball bearing. The weight of the lifting parts is counterbalanced to within a few hundred pounds and the unbalanced weight is supported by a roller against a cam. Power for operating the valve is supplied by an electric motor mounted on the valve and moving with it. In reversing the six-way valve the main shaft makes one complete revolution as shown in Fig 5. During the first quarter turn of the shaft, the valve is raised 5 inches vertically to clear the bottom of the seal pans, this elevation being accomplished by the cam backing off the roller. At this point the crankpin engages the connecting rod and during the next half turn of the shaft operates a rack. The movement of this rack against a segmental gear attached to the stationary pintle causes the valve to rotate 120 degrees starting from a dead center and stopping on another dead center.

During the last quarter turn of the shaft, the cam allows the value to lower vertically into the seal pans and stops the motor by means of a limit switch. A circular portion of this cam allows for a reasonable overtravel of the valve and, should the limit switch fail to function for any reason, the valve cannot be damaged. However, for insurance that the valve always will seat in the same position, a locking pin is used to lock the rack and the main housing. The control mechanism and limit switch is manufactured by the Cutler-Hammer Mfg. Co., Milwaukee.

Although the valve is constructed so that the center of gravity is approximately in the axis of the ball race, three upper and three lower bronze bearings are provided in the housing casting to take care of any side thrust from the pintle bearing. These bearings, as well as the other principal bearings, are provided with graphite inserts to supply proper lubrication at all times. All gears are machine cut and the worm is of hardened and ground nickel steel running on ball bearings in oil. On account of the ball bearing support and

the counterweighing, the valve is built so that in case of mechanical or electrical trouble a workman can put a bar in a hole in the counterweight, pull it down and revolve the valve to the reversed position. As pointed out before, the gas main is overhead but where only small headroom is available, the valve is modified so as to make all outlets from below. This fact thereby overcomes what might otherwise be considered an objection to this type of reversing valve.

Burnout Position is Manual

To illustrate how the six-way valve functions in its two normal positions, as well as the burnout position, the sketches shown in Fig. 1 have been prepared. The sketch at the left shows one operating position while the center sketch shows the valve rotated counterclockwise through an arc of 120 degrees to the second operating position. In actual operation the valve can be reversed in about 10 seconds. The sketch at the right shows the valve in the burnout position. This position is obtained by swinging the valve by hand so that the gas tube connects directly to the stack.

Although many of the principal advantages of this type of valve have been mentioned in the above description, several others are worthy of comment. Because of the separate and external water seals, the possibility of internal leaks has been eliminated. Since it is first necessary to close the gas line valve before the valve can be reversed, and furthermore, since there is no direct connection between the gas tube and stack, no gas can be wasted to the stack during reversal. With no contraction of gas passages through the valve, free flow of the gas is made possible. No water cooled parts are imbedded in the brickwork or underground and no platework is subjected to corrosion from contact with water. Drop in temperature in the valve is small since the tubes are well insulated and the gas has little exposure to water. All seal pans are external and can be cleaned while the valve is in operation. No part of the valve is suspended from the charging platform and there is an absence of cables and sheave wheels to provide operation. In addition, space behind the regenerators is left comparatively unobstructed.

Two of the new type valves are now being installed at the La Belle plant of the Wheeling Steel Corp., Steubenville, O., and contracts have been placed for 13 others, one by the Bethlehem Steel Corp., for its Sparrows Point, Md., plant and 12 by the Wisconsin Steel Co., for installation at South Chicago, Ill. All the installations just mentioned are for soaking pits. The six-way valve, described in this article, was developed by Willis McKee, formerly associated with Arthur G. McKee & Co., Cleveland, but who has recently opened offices as an engineer and contractor at 2422 Euclid Avenue, Cleveland, to specialize on rolling mill and open-hearth furnace design and equipment.

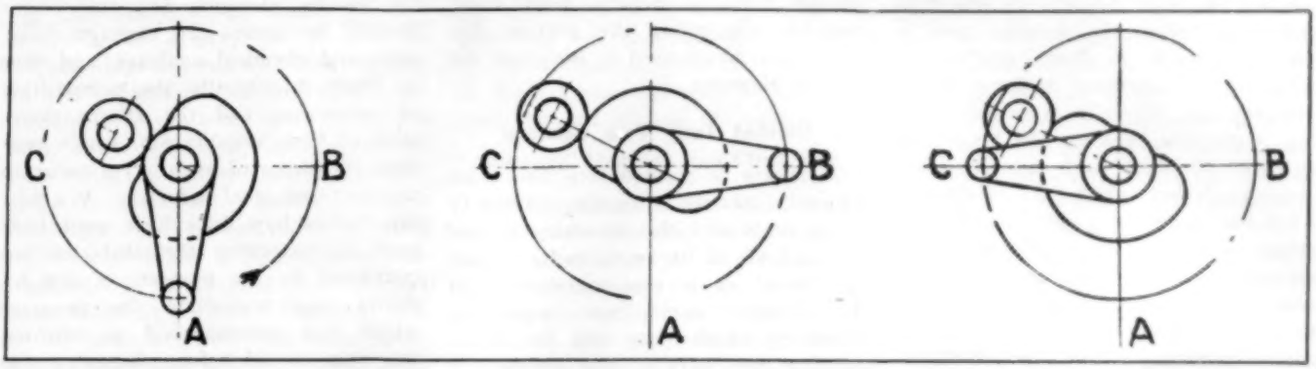


FIG. 5—(LEFT) SKETCH SHOWING POSITION OF CRANK AND CAM WHEN VALVE IS SEALED. ONE-QUARTER TURN FROM *A* TO *B* IN DIRECTION OF ARROW LIFTS VALVE FROM SEALS. (CENTER) POSITION OF CRANK AND CAM WHEN VALVE IS LIFTED CLEAR FROM SEALS. ONE-HALF TURN FROM *B* TO *C* COUNTERCLOCKWISE MAINTAINS VALVE IN RAISED POSITION AND SWINGS VALVE 120 DEGREES. (RIGHT) POSITION OF CRANK AND CAM WHEN VALVE HAS SWUNG 120 DEGREES. ONE-QUARTER TURN FROM *C* TO *A* LOWERS VALVE INTO SEALS AND COMPLETES THE CYCLE

Finds Elastic Limit of Metals by Sound

According to experiments conducted by the physics department of Lehigh university, Bethlehem, Pa, it is believed that stretching a metal until it squeaks and listening for the squeak with a microphone will give a test showing how much strain that metal can stand when used in a place of stress, such as a bridge girder or railroad rail. Those conducting the experiments point out that the tests may result in a novel and quick method for determining the elastic limit of metals. Forgings could be tested rapidly before are put in use.

Several metals have been used in the tests. While the investigators listened through a sensitive microphone similar to the dictaphone for the faintest sound, the metal was subjected to a gradually increasing pull until it broke. It was found that squeaking, rasping sounds were produced after the pull had reached a certain definite value, and this value was different for the various metals used. The tests were indicated that the sounds were not produced until the elastic limit of the material had been reached. The work will be continued.

Simplify Ways of Detecting Carbon Monoxide

Announcement of the simplification of methods of detecting carbon monoxide was made recently by Secretary of the Interior, Hubert Work. Investigations carried on by the bureau of mines, department of the interior, have resulted in the finding of means making it is possible to discover within 3 minutes the extent that a person has been affected by carbon monoxide gas. This is determined by the poison saturation in the blood. Previously, it took from 24 to 28 hours before diagnosis could be made of such cases either in hospitals or well-equipped laboratories with the services of a skilled organic chemist. The test is effected through a simple and inexpensive instrument which may be carried in the pocket and which requires no special training for its operation. Carbon monoxide is the universal industrial poison gas and manifests itself at mine explosions and fires, combustion of explosives in the atmosphere around coke ovens, coal gas, water gas, etc.

MadeCommittee Chairman

George H. Shepard, professor of industrial enginering and management at Purdue university, Lafayette, Ind., has been appointed chairman of the committee on fatigue elimination of the Society of Industrial Engineers to succeed Frank B. Gilbreth, consulting engineer, Montclair, N. J. Professor Shepard is a member of the American Society of Mechanical Engineers as well as the Society of Industrial Engineers.

Chemistry Develops Metallurgy

Progress Made in Iron and Steel Industry Hinges on Understanding of Chemical Phenomena—Steelmaking Processes Governed by Chemical Analysis—Further Advancement Depends Upon Research

BY WILLIAM A. FORBES

BOTH the quality and amount of all materials involved in steelmaking processes are governed by chemical analysis, which is also employed to determine whether the steel produced is of the desired grade for rolling, forging or casting. In fact, every step in the production of steel is marked by a complete chemical analysis, from the raw materials going to the blast furnace to the final treatment before the finished part is placed in track, structure, machine or wherever it is destined to serve. These analyses are carefully recorded, making it possible to trace the history of a piece of steel back to the blast furnace from which it originated. This knowledge of conditions at each stage of manufacture eliminates the element of conjecture, the test tube and balance of the chemist fixing proportions to a nicety and making determinations beyond peradventure. Thus standards once established can be followed readily thereafter.

The blast furnace frequently is designated as a chemist's crucible on a mammoth scale and is operated strictly on chemical principles.

Chemistry probably is the oldest recognized art and as such was practiced as far back as 4000 B. C.; chemistry continued to be practiced as an art until about the middle of the seventeenth century, or less than 300 years ago, at which time is commenced to be practiced also as a science and its real value to the iron and steel industry began.

Of Egyptian Derivation

The origin of the word chemistry is generally recognized as Egyptian, that country being probably the birthplace of chemisty, though the derivation of the word appears somewhat doubtful, being ascribed by some as coming from the name of the Egyption god Khem, the god of generation, productiveness and vegetation. It is more likely, however, that the word chemistry is derived from the Egyptian word "chemi," meaning the "black land," the ancient name of Egypt. This may be the reason for chemistry long being known as the "black art."

Opposition to scientific research in olden days was strong and often resulted in social degradation, imprisonment, torture or death. Consequently, in the study of chemistry, secrecy was necessary and, therefore, symbols of various fantastic designs were used, probably suggesting the present day chemical symbols used to designate the various elements.

Divided Into Two Sections

Chemistry is divided into two main sections, namely, organic chemistry which deals with the chemistry of carbon and all of its compounds, excepting those which are constituents of the mineral world, and ingorganic chemistry which deals with the chemistry of the metallic and nonmetallic elements and compounds. As we shall see, both organic and inorganic chemistry have been, are, and undoubtedly will continue to be of great service in developing the iron and steel industry by the application of chemical laws to the art, in the preparation of chemical compounds, their analyses, and their use in arts and manufactures.

The first method of testing iron ores was by fire assaying in the so-called dry manner, probably originating in the sixteenth century. These tests consisted in roasting the ore and then separating with a magnet, the magnetic material being retained and used and the nonmagnetic material being discarded as useless. The first laboratory where students could receive a thorough practical training in chemistry supplementary to the instruction given in the lecture room, was installed in 1825.

As an example of the progress of the application of chemistry to the iron and steel industry, the first chemist was employed in an iron or steel works laboratory in this country in 1860 when Capt. R. W. Hunt was engaged by the Cambria Iron Co.

It is only 50 years since construction of the great Edgar Thomson works was commenced, namely, 1873. At that time, while it was considered that a chemist in the works might be of some use, he was regarded largely as an unnecessary evil. The recognition of the value of the iron and steel works chemist was, as we all know, rapid and his sphere of activity and consequent value to the art was enlarged rapidly.

It is largely the ability to isolate the various elements and their compounds by means of chemical reactions and chemical analyses, and thus to study intelligently the composition of substances and the effects thereupon of their constituents, which renders chemistry of such great value to the iron and steel industry. We now can realize how difficult it must have been to overcome the obstacles encountered by the pioneers in our industry and appreciate the progress which was accomplished in reaching the stage it did before chemistry was applied practically. In the manufacture of iron and steel, the chemical laboratory is absolutely necessary to control its composition and make possible the production of steel, the composition of which has been proven to give the best results for certain purposes. When steel gives good results for certain purposes chemical analysis allows us to continue making a similar grade; and when for any reason steel fails, chemical analysis usually determines the cause.

Raw Material Analyzed

All raw materials employed in iron manufacture must be analyzed carefully and graded to insure successful blast furnace operation and regular production of uniform iron. Commencing with iron ore, coal, limestone, in fact all the raw materials entering into the manufacture of iron and steel, the application of chemistry governs in the first place their purchase by determining their composition and disposition.

By means of chemical analysis of coal, we are able to determine definitely the exact composition of the coal, its suitability for coking purposes and the amounts of the various by-products which can be recovered therefrom. This is of value in determining

---

From a paper presented at the New York meeting of the American Iron and Steel institute, May 25. The author is metallurgist, United States Steel Corp., New York.

the value of coal when a purchase is contemplated. It is only a few years since all of this was done by rule of thumb. Chemistry allows us to know the amounts and nature of the impurities contained in the coal and to what extent such impurities as ash, sulphur, and phosphorus, for instance, must be reduced, or may be present in the coal for its best economical use. In the washing of coal, chemical analysis regulates the loss of combustible and usable coal in the waste. The same remarks apply to iron ore, limestone, etc. In the case of limestone, chemical analysis, besides determining the general character of its composition, shows also the point to which screening should be carried for the best all around results by enabling us to calculate the fluxing value and the proportion which should be discarded at the quarry.

Chemistry shows, for each of the various processes employed in the manufacture of iron and steel, the ores, coals, limestone, etc., which are best suited so far as chemical composition is concerned. Indeed, without chemistry, the manufacture of steel from ores high in phosphorus for instance, as discovered by Thomas and Gilchrist, which discovery led to the basic bessemer and basic open-hearth processes, would probably have been impossible, or at any rate would have been deferred.

Important In Coke Making

In the manufacture of coke, one of the principal raw materials employed in the manufacture of iron, the development of by-product coke ovens can unquestionably be credited to the application of chemistry, inasmuch as the commercial saving of the by-products overcomes the much greater investment cost of by-product coke ovens as compared with beehive coke ovens. The commercial value of the by-products is governed by their chemical composition and the ability to manufacture successfully commercial products from the chemicals therein.

From the vapors and gases of distillation, tar is condensed, and ammonia products, and oils of the benzene series are recovered. By operations based upon the principles of organic chemistry, refinement of tar produces almost limitless series of dyes, acids, drugs, flavors, perfumes, etc. The ammonia in the gas is brought into contact with sulphuric acid, producing sulphate of ammonia, which is one of the most valued fertilizers in existence. The ammonia also is used for the manufacture of various chemical compounds, such as ammonium carbonate and ammonium nitrate. Ammonia also is used extensively in refrigeration and in the manufacture of soda ash for glass manufacture, the soda ash process being itself a strictly chemical process from beginning to end. Incidentally soda ash is used extensively by the steel industries and many others, for the treatment of hard water. The benzol oils absorbed in a petroleum product and later distilled to produce benzol, toluol, xylol, etc., with their potential properties of light, heat, power, explosion and dye base.

The railroads, which transport these various raw materials such as ore, limestone, coal and coke to the blast furnaces, have been developed to their present carrying ability largely through the application of chemistry, which has permitted specified railroad materials of the composition proven best suited to their needs, not only in iron and steel, but all classes of materials

Smelting Depends on Chemistry

Iron smelting in the blast furnace or chemist's crucible, briefly may be described as a series of reducing and fluxing processes, the oxide of iron in the ore losing its oxygen to the carbon of the coke, while the impurities in the ore, such as silica and alumina, combine chemically with the lime and magnesia of the limestone, or dolomite, and form a slag. In no part of the manufacture of iron and steel has the chemical laboratory and the application of chemistry been of greater service than in affording the necessary close control in the operation of the blast furnace for the production of pig iron. Incidental to the smelting process proper, which is governed chemically by the analyses of the raw materials entering, and the pig iron, slag, and gases, leaving the furnace, further control by chemistry is had of the combustion of the gases in hot blast stoves and under boilers, for instance, by analysis of the products of combustion and consequent saving. Chemical analysis also determines the suitability of the slag required for the manufacture of cement. It also allows us to detect the presence of potash in the flue dust, when potash is present, and its separation therefrom when sufficient of this valuable fertilizing medium exists in the flue dust to permit its commercial extraction.

Even in the period prior to the pig iron being charged into the bessemer converter or open-hearth furnace, chemical reactions occur which reflect upon the quality of the steel and have a bearing upon the method of operation. For instance, where basic bessemer iron is used and passed through large mixers en route to the converter or open-earth furnace, a combination of manganese and sulphur occurs forming a slag and reducing the sulphur in the iron to a workable degree. Also, when cold iron is melted with coke in cupolas, the iron takes up sulphur from the coke into and tapped out of the cupola to guard against the production of iron too high in sulphur.

Old Methods Were Used

Prior to the days of steel, the manufacture of iron was to a great extent an empirical art, and the estimation or control of the impurities occurring in the manufacture. It was apparent, of course, in the puddling and crucible processes then prevailing, that certain elements imparted certain qualities such as hardness, toughness, and brittleness to the product, but the effect upon the quality of the iron due to the amounts of carbon, manganese, sulphur, phosphorus and silicon contained, were not understood.

Pig iron is converted into steel by two main general processes now in vogue, namely acid, or basic, or a combination of both. The acid bessemer and then the acid open-hearth were the first processes for the manufacture of steel developed upon what we consider today a commercial basis. The designation acid is chemical in metallurgy and is applied to those nonmetallic elements which combine with oxygen to form acids. This is strictly what occurs in the acid process, where the principal nonmetallic impurities, existing in the iron, namely silicon and carbon, are oxidized or acidified, the oxide of silicon or silica entering the slag and the carbon burning to carbon dioxide and passing away.

In other words, an acid slag is used which furnishes the necessary oxygen for the silicon and carbon in the iron. On account of the character of the slag in the acid process, the phosphorus in the iron cannot be reduced and consequently great care has to be exercised in selecting ores and other raw materials to keep the phosphorus in the iron sufficiently low. This action is governed by chemical analysis.

The designation basic used in metallurgical is also chemical and applies to metallic elements and substances which combine with oxygen to form bases. The basic process of making steel consists of introducing into the lining of the bessemer converter or open-hearth furnace and into the

charges a basic material, usually lime, which has the property of combining with the phosphorus in the iron to form slag after the phosphorus has been oxidized to phosphoric acid. In the basic bessemer process, this oxidation of phosphorus is accomplished by blowing air through the iron in the converter and lime is added to the converter to absorb the phosphoric acid thus formed. The resulting slag, containing 18 to 22 per cent of phosphoric acid, is regarded highly as a fertilizer and all produced is used for this purpose. It is necessary, however, to overflow the iron in the basic bessemer process in order to reduce the phosphorus to a workable extent, and this is objectionable, inasmuch as it introduces another detrimental impurity into the steel, namely "oxide of iron."

Iron Ore Supplies Oxygen

In the basic open-hearth process, the oxygen required for the oxidation of the phosphorus in the iron to phosphoric acid is supplied by iron ore, which is oxide of iron. In other words, an oxidizing slag is employed and although oxide of iron is introduced into the bath, its oxygen is used largely in oxidizing the carbon in the iron. In the basic open-hearth process it can be controlled to considerably better advantage than in the basic bessemer process.

The acknowledged inferiority of basic bessemer steel, as compared with acid bessemer or acid open-hearth steel or basic open-hearth steel, is due mostly to the inclusion therein of dissolved oxide of iron. We do not believe a satisfactory method of chemical analysis for determining this impurity, namely, oxide of iron dissolved in steel, yet has been developed, but we hope chemistry before long will. Similarly the character, amounts and effects of occulded gases in steel have not been solved with entire satisfaction.

In the crucible process, the chemical reactions are more simple. The metal is overlaid with a slag, which, though not as oxidizing as the open-hearth slags, is much more oxidizing than the electric furnace slags. There is a reaction between the molten metal and the walls of the crucible during the killing period; that is, after the metal is lying quiet after having been melted. Both carbon and silicon are absorbed from the material composing the crucible. Silica is reduced to silicon by the carbon present and then is ready in the nascent state to reduce oxide of iron. Being thus again converted into silica it rises to the surface of the metal into the slag. The carbon also acts as a reducing agent with respect to iron oxide, but under these conditions it is not possible to make low carbon steel. As it is not possible in the crucible process to remove phosporus or sulphur, raw materials of high quality must be used.

Eliminate Phosphorus and Sulphur

In the electric steel process, both carbon and silica exist in the slag, and not in the container, and it is possible to make low carbon steel in the electric furnace, as well as to eliminate both phosphorus and sulphur from inferior raw materials. For the removal of phosphorus, it is necessary to add iron ore to provide an oxidizing slag which will oxidize the phosphorus to phosphoric acid and then combine it with the lime to form phosphate of lime. After the removal of the slag containing the phosphorus a second slag is used, which is so highly reducing, due to the presence of finely divided carbon strewn over it, that not only is all the iron oxide in the slag reduced, but the oxides which rise from the metal into the slage continuously are reduced. This action may be compared to the action of a blotter soaking up a pool of ink, where successive blotters are used until eventually all the ink has disappeared and the last blotter remains clean.

So strong is the reducing action that manganese ore may be rduced to manganese and pass into the bath, tungstic acid reduced to tungsten, vanadic acid reduced to vanadium, chromic oxide reduced to chormium, silica reduced to silicon, and so on with most of the metallic oxides, so that it is only a matter of electrochemical calculation to determine in advance how much ore, how much reducing agent in the form of carbon and how many thermal units in the form of kilowatt-hours are necessary to give any required amount of any desired element, without employing the pure metal or a ferroalloy as a means of making the various alloy steels.

Gas Making Is Chemical Process

Many thousand tons of coal, in the form of producer gas, are used every year for melting and heating steel. The conversion of the coal into the more convenient gas is a chemical process. In gasifying the coal, the carbon is burned partially to the inflammable gas carbon monoxide by adding oxygen from the air, and by the addition of steam, water is broken up in the hot coals, thus supplying the oxygen for the formation of additional carbon monoxide and liberating the hydrogen. The sensible heat in these gases drives off the volatile matter in the green coal. The combination of these various gases results in producer gas.

Although gas was made from coal before the chemical operations were understood, the knowledge of the chemistry of the gas producer enables us to make better gas and use the coal more efficiently. To have a check on the chemical reactions going on in the gas producer, we send samples of the gas to the laboratory and find the quantities of CO, CH_4, C_2H_4 and H contained therein to determine the thermal value of the gas and in addition to this we learn from the content of CO_2 whether the gas is being burned and consequently wasted in the gas producer instead of being delivered to the furnace. This has become so important that now continuous sampling and analyzing are performed automatically.

Adapted to Refractory Making

The application of chemistry to the development of suitable refractories for furnace linings, of various characters to suit the steel processes developed, has been extremely beneficial. It has resulted in the application, among many other materials, of chrome ore, bauxite and zirconia, which latter is probably the most refractory material known, withstanding a heat of 4000 degrees Fahr. before melting.

It was not until 1786 that iron carbide and graphite were isolated, leading the way to the knowledge of the part played by carbon in the conversion of iron into steel, and later developments in chemistry paved the way to our present knowledge of the various forms in which carbon exists in steel. Chemistry is responsible directly for the production of alloy steels which are used now to such a great extent. The chemist does not impart the resulting qualities or actions to alloy steel, but by means of chemistry in the first place he was able to isolate the materials and elements used in its manufacture, and then by chemical analysis to control the composition of the product. Alloys no longer are considered as simply a mixture of two metals as formerly, but are recognized now as being solid solutions, in other words, nickel for instance dissolves in steel just as sugar dissolves in water.

Some alloy steel develops odd contradictions in their own compositive qualities; for instance, iron is the most magnetic metal known and manganese is also magnetic, but their alloy, manganese steel, is entirely nonmagnetic. An example directly contradictory to this is low hysteresis steel which is more subject to magnetic influences than pure iron, although it is an alloy of iron which is strictly magnetic and silicon which is nonmagnetic. Nickel also is magnetic, but a nickel steel containing 25 per cent nickel is not magnetic and resists corrosion well, and a steel containing 36 per cent nickel neither expands nor

contracts with varying degrees of temperature.

Steel containing 12 to 14 per cent of chromium constitutes stainless steel. A still more recent development is that of rustless iron or stainless iron which is the same material as stainless steel excepting that the carbon content is low, permitting the material to be worked into sheets for deep stamping; for example, for cooking utensils, wire and many other articles of manufacture where resistance to oxidation and to heat and corrosion in the air is of great importance. Permalloy is an alloy of iron and nickel which is likely to be valuable for electrical work. Tungsten is alloyed with steel to give the so-called high speed steels. Molybdenum is similarly used though it does not impart the desired qualities to the extent that tungsten does. Protection from corrosion is secured through the alloying of copper with steel, the addition of as small an amount as 0.25 per cent of copper affording excellent results.

It will be seen that the processes for manufacturing steel are strictly chemical processes from beginning to end, and of these, the basic bessemer and basic open-hearth processes could not have been commercially developed without the scientific application of chemistry. Neither could the electric furnace process have been developed without the application of chemistry, this process involving more scientific application of chemistry than probably all the other steel processes combined.

After steel is rolled, forged, cast or machined to required dimensions, it often is desired to impart certain special properties and this can be done through the agency of chemical processes. Steel may be case hardened by being packed in some carbon producing substance, generally wood charcoal, and subjected to heat. The carbon will enter the steel and combine with it in solid solution, the depth of penetration depending upon the time of exposure and the amount of heat applied.

Again, white iron in which the carbon is practically all combined and which is brittle, can be converted into black heart malleable iron, which is decidedly the opposite of brittle, by heating the white iron for a number of days packed in some protecting material, such as iron ore, the combined carbon being converted to graphitic carbon in this treatment.

Saves Time and Money

Although it might be possible to control the various elements in malleable iron empirically, going back all the way to the blast furnace, how much easier, simpler and less costly it is for the malleable iron founder to know what are the contents of carbon, silicon, manganese and sulphur in his metal before casting it in expensive molds and then placing it in annealing boxes, where it must remain for days with a large consumption of fuel for heating.

To bring out the latent qualities of steel, heat treatment often is employed and this effects structural changes which bring about increased strength and hardness or ductility depending upon the character of treatment to which the steel is subjected.

Directly or indirectly many chemicals and chemical processes are involved in the production of steel and are used in connection with equipment of plants at which steel is produced. It would be impossible to manufacture steel by modern methods without these chemicals and a knowledge of their commercial application to the steel industry. One of the most important is sulphuric acid, which is used principally for the recovery of ammonia products from gas for pickling finished steel products that require an absolutely clean surface. Sulphuric acid is not a solvent for scale on steel, which is an iron oxide, but the acid penetrates through minute crevices invariably found in such scale and attacks the steel underneath, loosening the scale which is readily removed. The action of the acid on the steel itself forms sulphate of iron which is an important chemical having a high commercial value. This sulphate of iron is recovered from the waste pickling liquor and also from coal mine water and is used extensively for treatment of water, manufacture of paint and for polishing glass and conversion into oxide for removal of sulphur from illuminating gas.

Use Much Sulphuric Acid

It is estimated that the iron and steel industry uses in the neighborhood of 15 per cent of the total sulphuric acid manufactured in this country for pickling and the manufacture of sulphate of ammonia. Sulphuric acid is made by two processes: The contact process which consists of oxidizing the sulphur fumes produced from brimstone or by roasting sulphide ores, through the medium of a catalyzer, generally platinum; and the chamber process which consists of oxidizing the sulphur fumes by nitric acid and absorbing in water vapor in a lead chamber. Some of the steel companies manufacture sulphuric acid from zinc ores in the manufacture of spelter, the resultant spelter being used for galvanizing purposes. Two tons of the usual grade of zinc ore are required to manufacture one ton of spelter and two tons of 60-degree sulphuric acid are produced in this process. Galvanizing is accomplished by introducing steel sheets or other products into a receptacle containing molten spelter upon which is floated a layer of such chemicals as salammoniac, keeping the steel clean and preventing the spelter from oxidizing. Chloride or zinc is recovered as a by-product in this process. Salammoniac also is utilized as a flux in tin plating. Nitre cake or sulphate of sodium is recovered in the manufacture of sulphuric acid and is utilized for purposes similar to sulphuric acid, for instance, pickling, etc.

There are great possibilities for obtaining sulphur as a by-product of the iron and steel industry. During the war when scarcity of sulphur in Germany was great, experiments were made to recover sulphur from blast furnace slag and the results were so encouraging that a plant was built. The slags used contained from 1 to 2.25 per cent of sulphur, averaging about 1.50 per cent. The United States produces approximately 20,000,000 tons of blast furnace slag annually, containing sulphur to make sufficient sulphuric acid for all the requirements of the steel works in this country.

Steel Cleaned with Lime Water

Calcium carbonate, or limestone, is one of the three principal iron smelting materials and is used as a flux in the blast furnace. Lime is an important base and this quality makes it valuable in basic steel making processes. Another important use follows pickling of finished steel products in acid. Such steel is washed with water and then immersed in a dilute lime solution, which performs the triple function of neutralizing any acid that may remain on the steel, coating to prevent oxidation and lubricating the piece for subsequent drawing, as is the case with wire rods.

Sodium chloride, or common salt, is used to clean the scale from plates during rolling. A liberal quantity of salt is sprinkled on the plate just before entering the rolls and the combination of heat and pressure causes the water of crystallization contained in the salt to explode, readily cleaning the plate.

Sodium carbonate, or soda ash, and other chemicals are used for water softening to neutralize the hardening effects of lime and magnesium salts, which otherwise would soon interfere with mill operations by forming a deposit in boiler tubes. Soda ash also is used to clean tank cars and other receptacles for such material as benzol. Sodium silicate, or water glass is used to make a paste of fireproofing material for repairing furnace walls, boiler settings and stack linings. Calcium carbide and oxygen are employed at all steel works for cutting and welding by the oxy-

acetylene flame. Borax is used as flux in welding.

The fact that every chemical has a definite melting point is taken advantage of in heat treating. Such compounds as sodium nitrate, potassium nitrate and others are used to accurately determine heating and quenching points. Rolling temperatures of sheets and other products may be definitely determined by dropping on the steel, crystals of potassium and other salts, the melting points of which are known.

When small steel parts such as cutting tools or dies are required with a clean surface, tempering in a bath of molten barium chloride prevents scaling or oxidizing. Barium carbonate and other carbonates are used in case hardening to increase the activity of carbon in the carbonizing medium. Steel placed in a solution of copper sulphate may be plated with metallic copper by electrolytic action. Copper sulphate is used to determine the uniformity of galvanizing and lead acetate to determine the amount of galvanizing.

In addition to these and many others, the steelworks chemical laboratories have a complete assortment of all the chemicals required for tests and analyses.

The application of chemistry to safety, sanitation and efficiency in the mining and metallurgical industries is important and valuable. Its application to safety covers the chemical and physical testing of explosives, and study of inflammability of gases and dusts. The results are important in connection with questions of ventilation, the determination of the effects of carbon monoxide and other gases in tunnels and in mines and in the industries, the effect of repeated exposures to carbon monoxide, the development of new methods for determining the percentage of carbon monoxide in blood, the analysis of drinking water and also the development of gas masks for industrial use.

Important in Electrochemistry

We have referred to the part chemistry plays in the metallurgy of electric steel processes, but there is another field of chemistry which is becoming broader every day and more important in filling the wants of civilization; this is electrochemistry. The development in the production of electric power by means of either water or fuel has been coincident with the development of electrothermal or electrochemical processes. Electrolysis is not a new thing, but only a few years ago, we could not have anticipated that large tonnages of zinc would be extracted from the ores electrolytically and that chemistry would solve the problem of overcoming the difficulties connected with the various impurities and metals found in those ores, and that it would be possible to compete commercially with the old smelting processes.

We are greatly indebted to electrochemistry for calcium carbide as a source of nitrogen for agricultural fertilization. While we talk about the wonderful development of the automobile, we must remember to what an extent the automobile industry is indebted to alloy steels and that the manufacturer of alloy steels is dependent upon the use of ferroalloys, most of which are produced in electric furnaces and are the direct result of the research of electrochemists. Other examples of electrochemical development are carborundum and artificial graphite which are made in such large quantities at Niagara Falls, N. Y. What an important part in the arts and manufactures, as well as in steelmaking, aluminum plays, a metal which is reduced by a combination chemical and electrolytic process.

While inorganic chemistry has become the tool and daily necessity of steel men and while physicists are learning more about the nature of electricity and electrical engineers are studying how to give us this valuable form of energy in cheap and convenient form, it is difficult to see the end of the possibilities of the development of electrochemistry and the part it may play in the steel industry.

What does the science of chemistry in the iron and steel industry hold for us in the future? Considering the tremendous progress which has occurred in the last 300 years, what will be accomplished in the next 300 years?

On April 15, 1923, there are 83 recognized elements, exclusive of 5 radio elements whose classification and identification are not yet complete and 31 additional radioactive substances which are probably elements although too indefinite as yet to be classed as such. Of the 83 recognized elements only 14 were known up to the end of the seventeenth century, 16 were discovered in the eighteenth century, 49 in the nineteenth century and only 4 so far in the twentieth century, although we must bear in mind the discovery in these later years of the radio elements and radioactive substances above referred to.

How many of the elements known as such today can be further subdivided it is impossible now to say, but that further subdivision will occur there is no doubt. Even iron may be further subdivided into elements not now known.

Will chemists of a hundred years hence regard as academic or futile our present day results, just as we look back on the days when chemical theories appeared just as sound to the chemists of those days as ours do to us today and which later were proven to be unsound and a retardation to the progress of the art? The day may come, and judging from past history, it will come, when our present chemical theories will be replaced. What will bring this about it is now impossible to state. Perhaps the further development of catalysis, which so far has found no direct broad application in the iron and steel industry, may pave the way for radical changes in the future.

May Find Simple Process

There exist certain substances which may lie in a vessel seemingly inert and yet by their presence determine occurring reactions. A substance which has this power is designated as a catalyst and the process is termed catalysis. The substance which exerts a catalytic influence is not itself affected by what it does and can be used over and over again. For instance the presence of a small quantity of platinum permits the combination of large quantities of atmospheric nitrogen with hydrogen forming ammonia, this constituting one of the main features of the Haber process for the fixation of atmospheric nitrogen as ammonia. The platinum used is not exhausted in the process, but can be used over and over again after a cleansing process to remove certain elements which gradually accumulate.

Possibly the day will come when impurities will be removed from iron ores by catalytic action in simple inexpensive equipment replacing the present expensive smelting operation. Perhaps colloidal chemistry will solve some of our problems in the iron and steel industry.

Colloidal chemistry is concerned with that state of matter in which minute particles of a substance are distributed or suspended throughout another substance. These particles of matter are below the range of microscopic vision, but can be seen by means of refracted light in the ultramicroscope actively moving about as if they were possessed of life. In a similar manner particles which are so small as to be beneath the range of vision may be seen suspended in air when we look across a beam of sunlight. An example of a colloid in the solid state is that of finely divided gold dispersed in glass, producing a beautiful ruby color, though the gold is invisible to us.

The importance of iron oxide colloids is recognized already and it is possible that the study of colloidal chemistry may teach us more than we now know concerning the constitution of steel. It is already being applied to the corrosion of steel.

The important question remains: How may further progress in the application of chemistry to the rion and steel industry be maintained? The answer is: In untiring and unremitting reseach.

Making Efficient Producer Gas

Practice as It Concerns the Production of Fuel for Metallurgical Use Is Reviewed—Theoretical and Actual Results Are Compared—Modern Types of Producers Designed To Provide Gas in Constant Volume and Quality

BY WALDEMAR P. G. DYRSSEN

IN THE absence of experiments, the only method at present available to determine the balance in ordinary gas producers is to draw conclusions from actual tests on producers or from actual practice. The tests which show the best gasification results give, of course, the best information. It can be assumed that the fuel bed in these tests was more even in temperature, freer from blowholes and otherwise more uniform, that is, in regard to the size of the coke or the coked coal and the percentage of voids in the different parts of the fuel bed, with more uniform distribution of blast and more uniform velocities. However, by carefully sifting data from other tests, much valuable information can also be obtained. The balances that exist in a producer are represented in Fig.. 1 and 2. They have been derived by considering a great many gasification tests of various bituminous coals and coke. The equilibrium balances are also shown in dotted lines.

The method of representing the balance is somewhat novel. Instead of the usual method of representing the gas in volumes or percentages of volume, the resulting gas is given in per cent by weight. This is more practical for the purposes served by these balances in this paper.

Establish Balances

It is evident from such balances as are shown in Figs. 1 and 2 that it is possible to establish heat and chemical balances for C gasified by any gas, whether air, waste gases, combustible gases, H_2O or any combination of gases at whatever temperature these may enter the gasification zone. The total heat input should equal the total heat output at balanced temperature conditions in the gasification zone. If such a heat balance shows excess or deficiency of heat, the gasification temperature will adjust itself until balance is reached.

In the calculation of the theoretical gas that can be obtained from bituminous coal, the distillation gas must be added to the gas derived from pure C gasified by blast, as calculated above. The distillation gas, however, is not subject to measurements or analysis. It can be reasonably assumed that its parallels the distillation gas from coke ovens and consists of CH_4, C_2H_4, H, CO, CO_2, H_2O, N, soot and tarry vapors. That the last item forms a considerable part of the producer gas is an everyday experience in the production of cleaned, cooled producer gas. The method commonly used to calculate the quantity of gas from the ordinary analysis and total C in coal is fundamentally incorrect. It is not possible to explain the presence as fixed gases in producer gas of all the C in the volatile matters in the coal. Bone and Wheeler found in their tests on Mond-type gas producers that the C in the tar was 6.1 per cent of the total C charged into the producer on coal with a ratio fixed carbon/volatile matter = 1.7. In producing cool, clean gas in this country, from 10 to 25 gallons, or an average of 15 gallons, of tar are obtained per ton of coal. According to tests made by the United States geological survey at St. Louis in 1904 with producer gas for gas engines, the C in the cleaned gas constituted about 75 to 80 per cent of the total C in the coals, with a ratio of fixed carbon to volatile of 1.25 to 1.75. Part of the remainder was lost in the ashes, but a large part was washed away as soot and tar. The higher volatile coals showed a lesser recovery.

We can assume, therefore, that the larger the amount of volatile in the coal, the more soot and especially tar are produced. All of the tar as well as much of the soot is undoubtedly suspended in the gas, at least in open-hearth practice, and is burned in the furnace. These constituents, as well as the H_2O, do not appear in the ordinary analysis of producer gas. Without doubt there is also some fixed carbon created in the distillation zone by the breaking up of tarry vapors, which is afterwards gasified by blast. From a study of various coal and gas analyses, the following figures have been worked out, as representing average conditions in the gasification of two classes of coal, which cover nearly all the important producer gas coals in America.

	Western Pittsburgh coals, per cent	Eastern Indiana and Illinois coals, per cent
Fixed carbon .....About	63	About 57
Volatile matter .....About	37	About 43
Total	100	100
C in volatile	21.0	22.5
Total C	84.0	79.5
C in fixed distillation gases..	11.8	11.0
C in tar and soot.....	7.2	8.5
C in ash	1.0	1.0
C gasified by blast.....	64.0	59.0
Total C in fixed gases from producer	75.8	70.0
Percentage of total C.....	90.2	88.1
C in distillation gases of C gasified by blast.....	18.4	18.65

From these figures it is seen that more tar and soot are produced from high volatile than from medium volatile coals, but the C in the fixed distillation gas is about the same as compared to pure C gasified by the blast. The composition of the gas represented in the above is also given in the accompanying table for more convenient use.

Theoretical Conditions Approximated

A comparison of gas analysis with the theoretical gas shows that under test conditions results close to the theoretical can be obtained with good gas coal, even during a prolonged run. For shorter runs, 9 to 12 hours, results have actually been obtained, both on eastern and high grade Indiana coals, which show 1 to 2 per cent above 100 per cent efficiency. This is probably due to a difference in the distillation gas, as the assumption made of the quantity and composition thereof for various coals can be an approximation.

The definition of the efficiency of producers as used today is indefinite. The heat value of coals is commonly given in gross B.t.u. per pound. This is not a true basis for comparing various coals, as is frequently pointed out by combustion engineers. It is unlikely, however, that this basis will be changed to the more rational net basis. In the following, therefore, producer efficiency means the net calorific heat in the gas from the producer, divided by the gross heat value of the coal from which this gas is obtained. In the net calorific heat in the gas are included the net heat in the tarry vapors, but not the heat

From a paper presented at the New York meeting of the American Iron and Steel institute, May 25. The author is metallurgist, United States Steel Corp., New York.

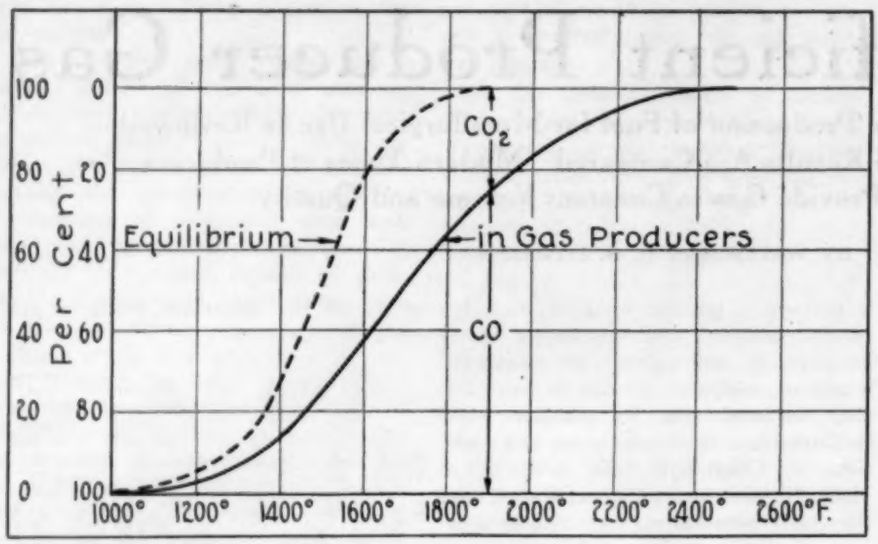


FIG. 1—COMPOSITION OF GAS BY WEIGHT IN SYSTEM C, CO, CO_2 AT VARIOUS TEMPERATURES OF GASIFICATION

in the soot that is deposited before the gas reaches the place of combustion. In the coal used, the coal, or coal equivalent, is not included, that is used to raise the steam blown into the producer or condensed in the steam line. The latent heat in this steam is not considered, nor the sensible heat in the blast, which in ordinary practice is obtained from the steam. To include the steam item involves a number of assumptions, which vary in different plants; and in a number of cases, waste heat is used to produce the steam. The coal, or coal equivalent, used to make the electricity for operating the mechanical producers, is not considered.

Determining Operating Efficiency

A method for comparing the actual producer gas from the analysis to a certain high standard has been mentioned previously. Such a comparison constitutes a simple method of judging the gasification without the necessity for considering the complicated producer efficiency. It follows that the higher the quality factor the higher, as a rule, is the total producer efficiency. The quality factor, however, does not take into account the loss of C in the ashes and the soot, the radiation losses, and those occurring in the cooling-water or the sensible heat in the gas. The actual efficiency of the producer must be considered when heat units in coal are compared to heat units in other fuels such as tar or coke-oven gas, and when values of various fuels are considered. It has been previously pointed out that the various present methods used for expressing the producer efficiency are all fundamentally incorrect, as they do not take account of the tarry vapors in the proper way. The tar has a net value of about 16,300 B.t.u. per pound of contained C.

Hot gas is used almost exclusively in steel works and the demands are such that, in the majority of cases, cleaned gas could not be used to advantage. The cleaning of the gas removes the tarry vapors, the sensible heat, and a large part of the moisture. For open-hearth furnaces, the tarry vapors are a necessity, as a luminous flame is required. The beneficial effect of the removal of the moisture cannot counteract the loss of luminosity. The sensible heat is not essential in open-hearth furnaces and soaking pits, where the gas is preheated before combustion by waste gases. The sensible heat, however, ultimately is partially recovered in furnaces equipped with waste heat boilers and has therefore a certain value. In heating furnaces, where the producer gas enters the combustion chamber direct, the sensible heat in the gas is valuable as it raises the temperature of combustion.

There is a considerable field, however, where cleaned gas can and should be used. This occurs when gas is to be supplied to a large number of smaller heating furnaces spread over an extensive area. The gas can then be produced in a central producer plant, cleaned and distributed under pressure in a pipe system, mixed with the theoretical proportion of combustion air and burned with high efficiency. The tar extracted from the gas should be recovered, charged back into the producer and converted into fixed gases or burned separately.

It has been shown that a maximum gasification efficiency is obtained at a temperature of 2000 to 2200 degrees Fahr. Above 2200 degrees Fahr. the efficiency drops off slowly until there is no moisture added to the blast. The gas from the gasification of pure C then will consist of CO and N only and contains as calorific heat 70.3 per cent of the heat in C. Only by using highly preheated blast containing moisture or waste gases can efficiencies be obtained in an ash fusing producer as high as with ordinary blast at lower temperatures. It does not seem likely therefore that the ash fusing producer will make much headway, and its use will probably be restricted to special cases for coke or anthracite.

It has long been known that the temperature of the gas has a marked bearing on the efficiency of gasification and the quality of the gas made. It is generally agreed that a low temperature gas is the best. A few theoretical considerations confirm this in a most striking manner. The sensible heat in the gas produced by the gasification of carbon by the blast is given up in its upward travel through the producer, as follows:

1. The carbon subsequently gasified by the blast is preheated, also the ash.
2. Volatile matter in the coal and the water is distilled off.
3. Heat is lost in radiation in the upper part of the producer.
4. There remains a balance of heat in the gas, which gives a definite temperature of the off-going gases.

As there is a given amount of gas at a definite gasification temperature and since the items above are fixed by a given coal, the producer employed and the rate of driving, it follows that the temperature of the gas leaving the producer has a minimum temperature which cannot be lowered by increasing the height of the coal bed above the gasification zone. This temperature can be calculated for each variety of coal.

Causes Unavoidable Surplus of Heat

In the producer operation, when blast consisting of air and H_2O is used, there is an unavoidable surplus of heat which cannot be utilized, except in heating the off-going gases. If there were a smaller volume of hot gases passing through the producer, as, for instance, if the blast contained no nitrogen, then the temperature of the off-going gases would be reduced below the minimum just considered. On the other hand, if blast consisting of air and waste gases were used, the volume of hot gases would be increased and the temperature of the off-going gases would be higher.

Similar conditions exist in metallurgical furnaces and other apparatus used in steel works, as, for instance, the blast furnace, the open-hearth furnace and recuperative furnaces. In the first mentioned, the gas leaves the top at a definite temperature, fixed by the de-

scending materials capacity to take up heat from the ascending gases. Other conditions being equal, this temperature cannot be lowered by making the blast furnace, say, twice as high. Only a reduction in the volume of the ascendng gases can lower the top temperature.

In the checkers of the open-hearth furnace and in recuperative furnaces, the waste gases can only give up the same amount of heat as the air or gases entering the checkers or recuperators are able to take up. Under such a condition, an increase in size of checkers or recuperators cannot further lower the stack temperature, radiation losses and infiltration of air being equal.

Analyzing Steam Consumption

It is believed generally that the blast temperature indicates the amount of moisture going into the producer and can be calculated by assuming the air to be dry and saturated at this temperature. This belief needs to be somewhat modified. When steam is introduced into air, the air is heated and part of the steam is condensed and exists in the blast as fog. The colder the outside air is, the more steam condenses. In most cases, the steam entering the nozzle is also wet, adding still more condensed moisture to the blast. This moisture enters the producer in the blast hood, which usually is only 8 to 10 inches below the hottest part of the fire. The ashes at this point are quite warm and heated by radiation from the fire and it is hardly possible that the fog is trapped in the ashes, taking into consideration also, the high velocity of the blast. Carefully made tests also indicate this.

In several producers, the water seal is so close to the fire zone that some additional moisture vapor is added to the blast from this source. It is well known that the ashes always are moist two or three inches above the seal. A certain blast temperature does not, therefore, give the same gasification condition or gasification temperature in all producers, and this fact must always be kept in mind in comparing results from various producers. On an average, it can be safely assumed that 10 to 20 per cent more moisture enters with the blast than the saturation temperature indicates.

The use of oxygen in gas producers has been proposed at various times. Due to an increase in combustion efficiency, a possible saving of 15 per cent of the fuel in open-hearth practice may be effected. As about one-half of a ton of oxygen is required per ton of ordinary bituminous coal, the price of oxygen should not exceed about 30 per cent of the cost of coal, the cost of additional H_2O not being considered, in order to make the process economical for steel works. Such a low price of oxygen is not yet in sight. The field for

With hand-poked producers, it was considered that 10 to 15 pounds of coal per square foot per hour was an economical rate of driving in steelworks practice. With the advent of the mechanically poked or surface agitated producer, with automatic coal feed, this was raised to 20 to 25 pounds. The most modern mechanical producers, with agitated ash zone and continuous automatic ash removal, have proven that rates as high as 50 pounds are perfectly feasible on most grades of both eastern and western coals, still maintaining an extremely high gasification efficiency. In fact, a low rate of driving does not give as high efficiency, due to increased heat radiation from the gasification zone. In the theoretical considerations, radiation losses from this zone were not taken into account. This is proper, as this zone has the shape of a pancake. The radiation loss through the brick-lined wall along the edge of this pancake is practically nil, and the radiation downward is recovered in the blast and transferred back into the zone. The radiation upward is only partly recovered, as far as the gasification zone proper is concerned, but it is only the extreme top that is affected at gasification rates of 20 to 50 pounds, and this has practically no influence on the gasification conditions. However, at a low rate of gasification, the radiation downward and upward, especially the latter, has a greater influence on the temperature in this zone, even if it were possible to maintain uniform conditions throughout the fuel bed. In such a case, less than the theoretical amount of moisture can be decomposed. This lowers the efficiency of gasification and makes it necessary to reduce the amount of moisture in the blast, that is, the blast temperature, in order to maintain the proper temperature of gasification. The practicability of rates of gasification as high as 50 pounds is still doubted by many, but in view of actual results obtained in fully mechanical and automatic producers this does not seem to be justified.

Control Equipment Essential

The most important instrument for controlling the operation of a gas producer is a pyrometer, preferably of the recording type placed in the gas outlet from the producer. It has been pointed out that good gas and high gas temperature cannot exist simultaneously. A record of the gas temperature from each producer, therefore, is nearly as indicative of operation as gas analysis, and in some respects more valuable. It will tell the operator practically instantly when a blowhole is formed, and enable him to close it before fusing takes place and clinkers are produced. Twelve, eight or six-hour gas samples cannot give such information. If a temperature record is made of the gas from each gas producer, analysis of the gas practically can be eliminated. From a cost standpoint, it is possible that temperature records will not be more expensive than gas analysis from each producer every 8 or 12 hours. A few steel works recognize this and have at least partially adopted pyrometers.

The gas temperature, however, does not indicate the temperature of the gasification zone. This temperature is closely related to the blast temperature and a thermometer in the blast pipe, therefore, is next to the pyrometer in importance. There are also devices on the market which keep the blast tempera-

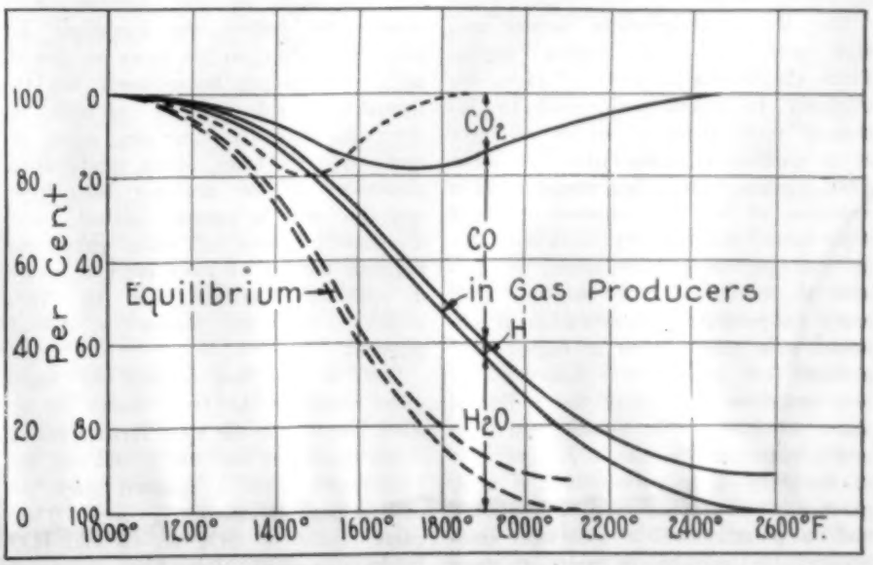


FIG. 2—COMPOSITION OF GAS BY WEIGHT IN SYSTEM C, H_2O, H, CO_2 AT VARIOUS TEMPERATURES OF GASIFICATION

ture constant automatically for any rate of driving, and take this important item out of the operator's hands. With these two instruments the conditions of gasification efficiency can be judged.

Other instruments to facilitate the operation are as follows: A steam pressure gage, showing the steam pressure for the turbo or the jet blower. This indicates the rate of driving; a blast pressure gage, or U-tube, showing the blast pressure. This indicates the condition in the fuel bed; a gas pressure gage; a measuring device, for measuring the rate of feeding coal. This is usually a simple device when automatic coal feed is used.

There is also an instrument for the continuous recording of B.t.u. per cubic foot of the gas produced. In addition to these, the operator should have a measuring rod for measuring the depth of the fuel bed, including ash, gasification and distilling zones, and should record his measurements. A device for keeping the gas pressure constant by regulating the blast is useful when a gas producer battery is furnishing gas for heating furnaces, or more than one open-hearth furnace. For open-hearth furnaces equipped with individual groups of producers, gas pressure regulation is not so important.

Preheating of the Blast

In the comparison between theoretical and actual practice, blast of 62 degrees Fahr. has been assumed in the former case. This is proper, as the sensible heat in the blast in actual practice corresponds to the latent heat given up by part of the steam being condensed to a fog. In the majority of producers, this fog enters the gasification zone also, as pointed out above, and the blast in actual practice, therefore, corresponds to a mixture of air and dry moisture at 62 degrees Fahr.

The Mond-type producer system uses blast preheated to a certain degree. From the theoretical point of view, the efficiency of combustion would be increased from about 45 to 49 per cent at a gasification temperature of about 1900 degrees Fahr. This would mean a reduction of fuel consumption of about 9 per cent. Another way to express this is, that preheated blast makes it possible to obtain the same efficiency at a lower temperature of gasification as obtained with natural blast at higher temperature of gasification. However, the heat necessary to produce the additional steam required and to preheat the blast would correspond to about 7.5 per cent of the fuel. Unless waste heat is used, practically no saving can be expected, and the operation will also be more complicated. In open-hearth practice, there is always sufficient heat in the waste gases, even if waste heat boilers are used, to produce all the moisture vapor required and preheat the blast considerably. To solve this problem in a practical way does not seem to be a difficult one, and a great saving in steam and coal can be realized.

Using Other Cooling Mediums

The addition of moisture to blast serves two purposes in the producer: 1. To maintain the temperature of gasification below the fusing point of ash; and 2, to increase the gasification efficiency. The first purpose is the most important, as otherwise, producers could not run except at a very low rate of gasification.

A popular way of expressing the action of steam is that "it breaks up the clinkers." This is not correct. Moisture, after it becomes superheated, does not act on coal ash or coal in any different manner than any other gas. Steam prevents clinkers only by cooling the fire. Any other gas could be used for cooling just as well. This was realized some 30 years ago by Siemens, who proposed to use waste gases and many others have since proposed the same or similar method. The soundness of this from a theoretical point of view has not been denied by competent investigators, but the savings that could be obtained often have been grossly exaggerated. That it has not been used to a greater extent is due to practical difficulties. It is necessary that the source from which the gases used for cooling are taken be dependable and that the composition of the gases does not vary to any great extent. The waste gas from the open-hearth furnace is not a good source; it varies greatly during each heat and still more during a run. It varies also between reversals, on account of air leakage being different in the two ends of the furnace. With waste heat boilers the conditions are somewhat better, as the gases are practically of constant temperature, but the composition still remains variable. At reversals, there is some gas going directly into the stack, which might cause explosions in the producer blast pipe, and this must be guarded against. Given a constant source of waste gases, the required amount of these must be mixed in constant proportion with air. This, however, does not present a difficult problem.

One of the best sources of waste gases available in steel works is the stack gases from the blast furnace stoves. These gases are uniform in analysis and temperature when a common stack for each group of stoves is used. These gases consist of CO_2, N, O_2 and H_2O. In case washed blast furnace gas is used, H_2O is low. The gases can be considered as a mixture of air and true combustion products. The proportion of N to CO_2 in these latter is about 1.8 and this ratio is lower than in any other combustion product. In open-hearth waste gases, the ratio is about 2.8. The reason for the low ratio in products from blast furnace gas is that part of the CO_2 in this gas is formed from O in the iron ore and part is derived from the limestone. This low ratio is of great benefit if the gases are to be used in producers as will be shown presently.

In judging the merits of cooling producers with waste gases versus moisture, one must take into account the gas analysis. The former gives a gas high in CO, low in H and H_2O. Moisture gives a gas low in CO, high in H and incidentally in H_2O. In such a comparison, the actual B.t.u. per cubic foot of dry gas can by no means form a basis for comparison.. One must take into account the combustion efficiencies of the gases, in which the H_2O content must not be left out. It is generally believed that in open-hearth furnaces B.t.u. in the form of CO are more efficient than in the form of H. Actual proof of this is difficult to obtain, but theoretically there is some foundation for such a belief. H_2O dissociates at a somewhat lower temperature than CO_2. This temperature is reached towards the end of the heat in the open-hearth furnace, and H therefore requires a higher excess amount of air to burn completely. There are also some practical points. H and H_2O make a lighter gas than CO and N, and with the former it is more difficult to hold down the flame on the bath. In practice, it is not impossible that the gas made from air and waste gases will show a considerable superiority over ordinary gas.

Blast Furnace Gas Has Advantage

Blast furnace gas presents another cooling medium that should not be overlooked. This gas withdraws heat if introduced into the fire zone, principally by being heated up, but at temperatures of gasification above about 1700 degrees Fahr. part of the CO_2 is broken up by C into CO.

From a theoretical viewpoint, the use of blast furnace gas as a cooling medium has many advantages. It is also of uniform composition and temperature. Its introduction into the producer, however, presents a problem. Two methods can be used: 1. The introduction of air and blast furnace gas separately in the producer at separte periods. This method would be similar to the production of water gas, except that only the blast consisting of air during the first period, and the blast furnace gas during the second period,

are to be reversed. The gas made during each period passes into the same flue. When two or more producers are operated in parallel on the same main, constant composition of gas is obtained. In the production of water gas, automatic control of reversals often is used. This can also be done still more easily in this case, and there would be little labor connected with the reversals. 2. The mixing of air and blast furnace gas together in the blast pipe near the blast distribution hood in the producers. The proportion of blast furnace gas to air is so small that the mixture is not explosive and futhermore the velocity in the blast is too great for combustion to take place. After entering the ash zone, the mixture could burn, but this would take place at about the same place as it enters the gasification zone. If proper check vales are arranged in the air and blast furnace gas pipes, it is possible that this method would be practical.

About 10 years ago the cost of steam in gasifying coal was comparatively a small item as compared to the total cost of gasification. This condition has gradually changed, especially since the advent of the mechanical labor saving producer. Under present practice and prices the cost of steam per gross ton of coal gasified varies between 35 and 70 cents. The cost of steam constitutes from 30 to 50 per cent of the total operating cost of gasification. The cost of steam therefore, is of tremendous importance. If waste heat boilers are used in the open hearth, the producer steam corresponds to 25 to 35 per cent of the total steam made in these boilers. Including the investment charges for producing the steam, the cost is still higher than that given above. The mechanical work that this steam accomplishes in creating the required blast pressure could be done by electric motor-driven fans with 2 or 3 kilowatt-hours or for 2 to 3 cents per ton of coal. Nearly the total cost of the steam, therefore, could be saved by the use of waste gases.

Producer Development of Years

Hand-poked, hand-filled producers of different types are extensively used in the United States. They probably constitute about 75 per cent of the total number of producers used in the steel industry, and gasify about 55 to 60 per cent of the total coal used in producers.

The modern partially or completely mechanical producer is a development of the last 20 or 25 years, and the most rapid development has been made during the last five years. The historical development will also be passed over. The rapid advancement of modern producers is due to the many experiments, with their failures as well as successes, and to the foresight of parctical men and those interested in the subject. In the early days of experimentation, failures were frequent and the investigators were sometimes forced to change their ideas radically as to how a mechanical producer should be built. At the present time, the development is going on perhaps more rapidly than at any previous time. There are, however, on the market today a number of successful mechanical producers, which do extremely good work.

The mechanical features of a producer may be divided into four parts: 1, Automatic coal feed; 2, automatic agitation of the fuel bed; 3, automatic agitation of the ash zone; and 4, Automatic ash discharge.

The most used coal feed is the drum type. In the Chapman types producer the drum type coal feed charges the coal into the center of the producer and a special cone distributes the coal over the fuel bed. In both of the Hughes-Wellman type producers, there are one or two drum feeds, depending upon the size of the producer, placed between the center and the edge. The Morgan and the Wood type producers also have a drum feed, placed in a similar position. In these three types, the fuel bed rotates, The Kerperley type producer is not equipped with automatic feed.

The agitation of the fuel bed is of great importance in a mechanical producer and saves more labor than the other items. Practically every farm implement used for breaking up the soil is represented in gas producers:—the plough, the tooth and disk harrow, cultivators, spades, etc. The agitator in the Chapman type producer consists of a horizontal bar fastened to a central shaft extended through the top, with driving mechanism above. The horizontal bar is equipped with tips pointing at an angle downward in the direction of rotation. The bar can adjust itself to the level of the fuel bed. This agitator has been successfully applied to hand-poked producers and other mechanical producers not equipped with surface agitation, as for example, the Kerperley type producer. The Hughes type producer has a swinging poker, which extends 10 to 12 inches down in the fuel bed. On the Hughes-Wellman type producer, the poker is placed at an angle against the rotation of the fuel bed. The top is stationary and the fuel bed rotates, and in the course of a few revolutions, the poker tip has covered the surface. This principle is also utilized in the Wood type producer, which has one or two bent pokers, depending upon the size of the producer, which rotate, the tip making a circular path the whole surface being agitated by the rotation of the fuel bed. The Morgan type producer is equipped with a leveler, hinged in the stationary top; the fuel bed rotates. The Sheldon type producer is equipped with two knives suspended from a rotating top. The knives are lifted and fall down, slicing the fuel bed. The stroke can be regulated. In the course of one revolution of the top, the whole fuel bed is chopped up. The Smith type mechanical producer has a rotating top with swinging, steam operated plungers, which poke holes into the whole surface of the fuel bed.

Composition of Total Theoretical Gas

From Ordinary Bituminous Coals Gasified by Air and Water

	Gasification temperatures			
	1600 Degrees Fahr. per cent	1800 Degrees Fahr. per cent	2000 Degrees Fahr. per cent	2200 Degrees Fahr. per cent
C_2H_4	0.51	0.57	0.60	0.61
CH_4	3.05	3.44	3.59	3.67
CO	13.80	23.22	29.10	31.36
H	17.70	15.78	13.29	11.10
Total combustibles, per cent	35.06	43.01	46.58	46.74
CO_2	13.80	7.62	3.47	1.56
N	51.14	49.37	49.95	51.70
Total, per cent	100.00	100.00	100.00	100.00
B.t.u. per cubic foot	129.31	158.61	172.61	174.80
C in 100 cubic feet of gas	1.002 lbs.	1.121 lbs.	1.182 lbs.	1.196 lbs.
B.t.u. per pound C in gas	12905	14177	14603	14615

Automatic Agitation Is Recent

The automatic agitation of the ash zone is a comparatively late addition to the mechanical producers in the United States. It has been proven that good gas at much higher rates of driving can be made thereby, and it is certain that more general use is going to be made thereof. In the Chapman type producer, there is a horizontal casting, made in the shape of a bar, located in the water seal. This is attached to a gear ring above the water seal. The bar is equipped with short vertical lugs which lift the ashes slightly when it

rotates slowly. The bar also forces the ashes out towards the circumference, where they are automatically removed. The old Hughes type producer did not have ash zone agitation, as the ash pan and shell were built together. In the new producer, however, the ash pan is not connected with the shell. The ash pan and the blast hood rotate with the producer by friction from the ashes. These parts are automatically stopped at short intervals, creating a twisting action at the bottom of the ash zone. The blast hood is shaped like a triangle or a hexagon, with rounded corners. This sets up a crushing action in the ashes in the plane of the hood, when the pan stops.

In the Kerperley type producer, the blast cone is located slightly eccentric in relation to the producer. The ash pan with the hood, rotates slowly, creating a twisting and crushing action in the ash zone. The Morgan producer has a spiral in the bottom of the rotating ash pan. This spiral can be stopped at will by the operator and discharge the ashes. The Wood type producer has scrapers attached to the rotating shell and the ashes are automatically removed continuously. The Smith type mechanical producer is not equipped with water seal, as are most other types. Instead, there is a brick-lined cone, closed by a gate. The ashes are removed from this cone from time to time.

In addition to these producers, there are a few other types introduced in this country, or about to be introduced. A producer, similar to the Wood type, is manufactured by the United States Iron Pipe & Foundry Co., Philadelphia. The Duff Patents Co., Inc., Pittsburgh, is introducing a producer with arms extended from the rotating center of the top. These arms have fingers which describe circular paths in the fuel bed. The Gas Producer & Engineering Corp., of New Jersey, New York, is introducing the Galusha type producer. It is equipped with a vertical shaft, which extends from the driving mechanism on top of the producer, through the fuel bed and the horizontal grating. To this shaft are fastened two flattened horizontal bars, which move in spiral paths, caused by the rotation and raising and lowering of the shaft. Both the ash and fuel zones are broken up by these bars. The construction is similar to the Talbot type producer, introduced some 25 years ago in England. The Galusha type producer uses a similar method for ash removal as the Smith type mechanical producer.

The average dimensions of the mechanical producers are 8 feet and 10 to 10½ feet diameter inside the brickwork. In one exceptional case, however, the diameter is as much as 16 feet.

Makers Adopt Standards for Crucibles

After more than two years of investigation and experimentation, the plumbago crucible manufacturers of the United States, acting through the Plumbago Crucible association, have completed the standardization of crucible sizes. Exterior shapes and dimensions were worked out for each size so that they could have a true and uniform relationship to every other size, the basis for capacity being 3 pounds of molten copper per number with an allowance of 10 per cent for working space. It was found that this gave an increased capacity on the larger sizes but that on the sizes No. 100 down it gave a smaller crucible than had previously been supplied by most of the crucible manufacturers. For example, a crucible user who had been using a No. 50 pot would have to use a No. 60 in the new size to give him the capacity to which he had been accustomed.

Standard Sizes of Brass Crucibles

Number	Height Inches	Top Inches	Bilge Inches	Bottom Inches	Approx. Cap. in Pounds Water
0	2	1 5/16	1 3/4	1 1/4	
00	2 1/4	2	2	1 1/2	
000	2 3/8	2 1/16	2 1/16	1 5/8	
0000	3	2 3/8	2 5/8	1 3/4	
1	3 3/16	3 1/16	3 5/8	2 3/16	.39
2	4 1/4	3 1/2	3 7/8	2 7/16	.78
3	4 7/8	4	4 1/2	3 1/2	1.17
4	5 1/2	4 1/2	5	3 3/4	1.82
5	6 1/8	4 7/8	5 1/8	4	2.21
6	6 1/2	5 1/4	5 3/4	4 1/4	2.60
8	6 7/8	5 5/8	6 1/8	4 1/2	3.13
10	8 1/16	6 1/16	6 7/16	4 11/16	4.8
12	8 1/2	6 1/2	6 7/8	5 1/16	5.6
14	8 7/8	6 11/16	7 1/16	5 1/4	6.4
16	9 1/4	6 15/16	7 1/2	5 1/2	7.2
18	9 11/16	7 1/16	7 11/16	5 11/16	8.6
20	10 1/16	7 11/16	8 1/16	6 1/16	10
25	10 11/16	8 1/16	8 7/8	6 1/2	12
30	11 1/2	8 5/8	9 1/16	6 11/16	14
35	12	9	9 1/2	7 1/16	16
40	12 3/4	9 3/4	10 1/16	7 1/16	18
45	13 1/16	9 7/8	10 1/16	7 11/16	21
50	13 3/4	10 1/4	11 1/16	8 1/16	24
60	14 1/16	10 11/16	11 1/16	8 1/16	28
70	15 1/16	11 1/16	12 1/16	8 11/16	32
80	15 5/8	11 11/16	12 11/16	9 1/16	36
90	16 1/16	12 1/16	13 1/16	9 1/16	40
100	16 11/16	12 1/2	13 1/2	9 1/2	44
125	17 5/8	13	14 1/16	10 1/16	50
150	18 3/8	13 3/4	14 7/8	10 1/16	60
175	19 1/4	14 3/8	15 1/16	11 3/16	70
200	20	15	16 1/16	11 7/16	80
225	20 3/4	15 1/2	16 11/16	12 1/16	90
250	21 3/8	16	17 1/16	12 1/16	100
275	22	16 7/16	17 11/16	13	110
300	22 1/16	16 7/8	18 1/16	13 3/16	120
400	24 1/16	18 1/16	19 1/16	14 1/16	160

1 lb. water = .96 pints or 27.7 cubic inches.

A list of the new standard sizes is shown in the accompanying table. To avoid confusion it was decided to adopt the new standards on the basis that had been developed and to step them back to the next lower number covering all sizes below No. 100. The dimensions of a theoretical No. 110 pot were used for the new No. 100 size. Under this plan, practically all of the new sizes come close to the average capacities of the old style pots formerly manufactured and the user may continue to purchase the size to which he has been accustomed. More than 90 per cent of the crucibles of the country already are made in these sizes. The new sizes have been designated "American standard."

Concludes Investigation of Sulphur in Coke

The United States bureau of mines gives the following conclusions from its investigation of the desulphurization of coke by air at its Pittsburgh experiment station:

1. At temperatures near 500 degrees Cent., it is possible to oxidize the larger part of the ferrous sulphide in coke to iron oxide and free sulphur, without causing any appreciable oxidation of the coke itself.
2. The free sulphur produced is retained in the coke in an absorbed form. It has been found impossible to remove this from the coke completely, and even part removal has been difficult.
3. The investigation has indicated that the industrial desulphurization of coke by air treatment is not practical as far as the methods which have been tested would apply. The chief difficulty in the application of the process lies in the tenacity with which the free sulphur is retained in the coke. If a method could be found for the complete removal of this free sulphur, metallurgical coke could undoubtedly be improved by the air treatment, since the solid solution form of sulphur, and the remaining ferrous sulphide enclosed in the coke walls, do not have the contaminating effect on the iron in the upper planes of the blast furnace that would have the ferrous sulphide which is capable of oxidation by this process.

More complete information on this investigation will be published in an early issue of IRON TRADE REVIEW.

Abrasive Output Larger

Production of abrasives gained considerably in 1922 over that of the preceding year, according to figures of the geological survey. Garnet output in 1922 totaled 7054 tons, and in 1921 amounted to 3048. A total of 1468 tons of emery was produced in 1922 as compared with 305 tons in 1921. Diatomaceous infusorial earth and tripoli produced in 1922 totaled 71,000 tons as compared with 67,474 tons in the preceding year. Pumice output in 1922 amounted to 50,047 tons as compared with 37,108 tons in 1921, while grinding pebbles and tube mill lining output in 1922 was 3159 tons as compared with 989 tons in 1921.

Standardization of methods for testing petroleum products and lubricants will be developed by a sectional committee under the sponsorship of the American Society for Testing Materials. The action is the result of steps taken in this direction by the American Engineering Standards committee.

Basic Factors Are Held Sound

Per Capita Production in Last 12 Months Below That of 1913 in Many Important Raw Materials—Consumption of Goods Expected To Remain High for Rest of Year—Outlook for Business Regarded as Good

BY JOHN C. HOWELLS

THE recent and current wave of conservatism that has come into the business world is a counterpart of the spring and early summer of 1916, during which period prices declined and activity slowed up and many business men thought that a long period of liquidation was impending. Today, we have unusually sound credit conditions which are being controlled by the banking authorities to the extent that legitimate business is finding credit accommodations at easy rates and in necessary amounts while speculation is being frowned upon.

While production of goods is running high, we have as yet no surplus. Much of the current production is going into current consumption. We have a reasonably high level of purchasing power among all classes of the population and no period of business history shows that a liquidation has ever started from a situation such as this.

In considering the outlook for commodity prices, I may state that most business men and all economic students have heard of the law of supply and demand but what it is, how it can be observed, and the symptoms of its operations were as unknown and until recently, as uninteresting as the theory of relativety or the nebular hypothesis. But this indifferent attitude is changing possibly because the present generation of business men are of a higher mental calibre, there are more executives of economic training and better diffusion of economic information.

Interested in Commodity Prices

In the last analysis, about the only thing the average business man is interested in is the movement of commodity prices. If we can assure him that over the period of the next six months or a year commodity prices will continue to advance or countrariwise decline, he has in a nut-shetll all the information that he thinks is necessary, but in order to determine with any reasonable degree of accuracy the direction of movements of commodity prices, it is necessary for us to study carefully the basic factors which have a direct bearing on commodity price tendencies.

The quantity of goods available for consumption at any given time can always be measured by the amount of basic raw materials which pass through manufacturing processes. No reasonable man will deny that this country today needs and can command as much mineral production as we did in 1913. I have worked out a comparison which shows the per capita production of the primary mineral raw materials for the year ending March 31, 1923 against the production of the calendar year—1913.

1913 Production Greater

The results show that in pig iron, we have 668 pounds per capital against 717 pounds; in steel ingots, 672 pounds against 725 pounds; in copper, 10.9 pounds against 12.7 pounds; in zinc, 8 pounds against 7.2 pounds; in bituminous coal, 3.8 tons against 5 tons; in coke, 0.39 tons against 0.48 tons; in petroleum 5.2 barrels against 2.6 barrels; in cement, 1.13 barrels against 0.95 barrels.

In these groups only zinc, petroleum and cement are in excess of the 1913 production and the excess is most marked in the case of petroleum, where production is about 100 per cent greater than the earlier period but consumption is at a still higher percentage than this. It would appear, therefore, that so far as mineral raw materials go, the present rate of production can be maintained for the next six months at least without producing even the amount of such materials that was produced in 1913, and this despite the fact that during the last twelve months, new records for monthly production have been made in pig iron, petroleum and cement.

Cotton is scarce and will be scarcer than it is now even if the recent rate of consumption should fall off materially. Cotton consumption for the last twelve months has been at the rate of 29 pounds per capita against 28.9 pounds in 1913, while supply has been reduced to such an extent that little if any carryover will be on hand this year.

Rubber supply is still abundant, at a price, but the success of the valorization policy enables the growers to finance considerable stocks of this commodity for the market. Our consumption for the last twelve months is 6.3 pounds against 1.6 pounds in 1913. With current prices sufficiently high to show a profit to the growers, the valorization stocks will, in all probability be gradually absorbed by consumers, and little reason exists for expecting materially higher prices in rubber.

On the grains, our per capita production shows about as follows: Last year's wheat production amounted to 7.9 bushels against 7.9 bushels in 1913; corn, 26.5 bushels against 25.4 bushels; oats, 11.1 bushels against 11.6 bushels; barley, 1.71 bushels against 1.85 bushels; rye, 0.88 bushels against 0.43 bushels; wheat, corn and rye have held their own but oats and barley are considerably below the 1913 production. In these items, we have a static condition which makes for rather stable prices.

Lumber production is still well below the prewar level as is turpentine and rosin on a per capita basis. Production in this group has not yet reached the point where any surplus is in sight and will, for the balance of this year contime to be so balanced.

Taking a summary of the primary groups of raw materials, supply is of such a character as to show considerably below the amount of such materials produced in this country in 1913. This is true whether we consider commodities as periodic:—that is, produced from year to year, or continuous:—that is, produced continuously. It seems evident that continued expansion for the rest of the year is not only logical but likely since little hope exists that a surplus of raw materials can possibly develop even if the high rate of production is held.

Factors In Demand

We come now to the discussion of the factors which indicate the law of demand, and this law is illustrated under five general headings which cover the channels through which goods pass into ultimate consumption. These are given as follows:

1. Government buying.
2. Railroad and public utility buying.
3. Building requirements.
4. Retail trade.
5. Exports.

All government receipts—whether federal, state or municipal must pass through the channels of trade in the purchase of consumers' goods. This is true wheth-

From an address presented before the Cleveland convention of the National Purchasing Agents' association. The author is associated with the Brookmire Economic Service, New York.

er or not the disbursements are made for interest payments, pension funds or direct purchase in the open market. This year the amount of such funds available for the purchase of goods will run into many billions of dollars.

Through the channel of railroads and public utilities large quantities of manufactured products of various kinds go into consumption every year and during the last year or so the increased earning on the part of such companies has enabled them to place orders for vast quantities of material for new construction and maintenance purposes.

The inadequacy of transportation facilities the railroads are making heroic efforts to remove. This is shown by the fact that about $1,500,000,000 worth of new equipment is now on order and it is expected that by October only 5 per cent of the rolling stock of the country will be out of service. The railroads this year on the basis of their earnings and partial restoration of credit are in a position to buy more heavily than any year since before the war. Furthermore, the increase in weight of rolling stock and the volume of traffic has necessitated increased weight in such items as bridges, rails and general track material, which has added considerably to tonnage required. With a degree of public confidence in railroad investment, the possibility of increased purchases by the railroads as their requirements are by no means filled is promising. As a market factor, railroad purchases now shape up as one of the big consuming channels for goods with a consequent strengthening of prices.

The building industry even under adverse conditions consumes large volumes of raw materials in the shape of lumber, brick, cement, steel, furnishings, etc. The active program now under way throughout the country is the principal cause of the high level of building material prices. Even were the present program materially reduced, it would take a long time for any considerable volume of these materials to accumulate. The outlook for demand in this industry for the summer and early fall is good, despite the fact that here and there a curtailment of programs is in evidence and building costs, especially in the labor items, are constantly mounting. By early fall, the peak of the present program should be reached and some recession in activity characterize the fall period, not only for seasonal reasons but for reasons that investment in building will at best be a precarious one, so far as returns over the next few years are concerned. It can reasonably be expected, however, that building demand will affect prices to the extent of maintaining the present level or causing further moderate advances throughout the balance of the building year.

Retail trade as it stands today is active throughout the country, showing a much higher percentage than a year ago but not so high as to justify any expectation of reduction throughout the balance of this year. Demand for goods at retail may be expected to continue heavy unless retail prices advance to a corresponding ratio with the recent advances in wholesale prices.

Export Outlook Good

The fifth channel through which goods reach ultimate consumption is exports, representing the demand of foreign buyers in our markets. Since the war both volume and value of exports have tended downward. This is not only true of our export trade but is characteristic of international trade in exports generally. The total value of export trade of 33 principal countries for the year 1922 shows practically level with that of 1913. When you consider that monetary units have greatly depreciated, that even the dollar today is at a discount of 37 per cent against the prewar dollar, it is evident that while the value is about the same the volume is much less.

So far as our domestic business is concerned, we are able to keep on manufacturing at the same rate as now for the next six months, before we can oversupply our own markets. With exports running at the rate of $350,000,000 a month, an increased export trade will not be necessary until such time as the volume of our domestic production exceeds the absorptive power of our own markets. By that time, the improvement in foreign countries will be so marked as to place them in a position to buy more heavily than now, especially of raw materials. Export trade can, therefore, reasonably be expected to constitute a bullish factor on general prices for the balance of this year.

The psychology of the average man is a forceful factor in business movements and must be given some weight even though this weight is not susceptible of accurate mathematical measurement. The current slowing up in business is due as much to the operation of this psychology as to any of all other factors combined. Though to me this seems nothing more than a check to a too rapid advance comparable to a runner getting his second wind, a good ball team in a slump or spring housecleaning. The spirit of caution that has been introduced in the last few weeks into the business world is not based on fact so much as on fear and this fear has been inspired by emanations from high places. It has little or nothing whatever to do with the fundamental situation however, and the character of business for the summer and fall will be little affected by the present current wave of pessimism.

Financial conditions now are exceptionally healthy and rates are easy and will continue so for several months at least. The credit situation is always one of the foundation stones of business and never has been sounder than now.

The labor situation constitutes today one of the uncontrollable forces that make for higher prices. Demands for higher wages are general throughout the country in all industries. Advances are being made without much opposition and constitute a factor of cost which must be handed on to the consumer. While business is expanding, there is little remedy for this situation, and while supply of labor is restricted under our present immigration laws shortages of labor must develop in many industries and production must be curtailed as a consequence. So far as the next six months is concerned, this handicap of industry will operate toward higher prices.

In summarizing the results of this analysis, I have tried to show that business operates according to fundamental and immutable laws, that these laws are now more generally observed than ever before as men have come to learn from severe experience the penalties for transgressing them. I have tried to show that of the all-inclusive factors, credit is sound, abundant and easy, supply of goods is somewhat below normal requirements, purchasing power is somewhat more than normal through high industrial earnings, through better agricultural prices, through dividend disbursements and this is shown to a great extent by increased savings bank deposits.

These foundation factors, as representing the fundamental situation and as reflected in the symptoms which exhibit their status, indicate expanding and progressive business for the balance of this year. I have tried to show in illustration of the law of supply and demand that supply of raw materials even though in some lines being produced at record rate has not yet reached the point where any excess even for domestic consumption is in sight, and by the time an excess production is achieved, a better outlet through export channels is likely to develop. I have tried to show that the factors of labor, of transportation, of agricultural political, and foreign conditions for the most part tend to indicate a broadening general demand as the year progresses, which constitutes a tremendously bullish influence on commodity prices.

For the early months of the summer, I look to see the recent conservatism operate to prevent any material advance in commodity prices, but this will only be a temporary affair and will offer buying opportunities before the scramble for goods for fall use begins.

Hand Wheel Adjustments Added to Grinder

A motor drive recently has been installed on a hob grinder manufactured by the Harris Engineering Co., Bridgeport, Conn. This motor drive consists of a standard electric motor mounted on the turntable at the top of the machine. Being mounted in this manner the entire motor can be swung to the required angle. The wheel is driven through a wide endless open belt with means provided for taking up a 3-inch belt stretch. The driving motor is shown clearly in the accompanying illustration.

The lower motor drives the reverse table mechanism, the indexing mechanism and the spiral generating device. This motor is mounted on an integral bracket and is fastened to the rear of the machine base. The necessary speed reduction is accomplished through speed reduction gears. The pump is direct driven by belt by the motor spindle. The motors are controlled from separate switch boxes of the safety type. Another change in design has been made in the vertical and lateral adjustments, these now being accomplished by a hand-wheel capable of making sensitive adjustments.

Designs Meter Stick for Measuring Rivets

A rivet length meter and table for use wherever rivets are driven and estimates are made on structural steel work has been introduced recently by W. Meyer of the Pneumatic Tool Sales & Repair Co., 57 N. Sixth street, Brooklyn, N. Y. The measuring device consists of a short meter stick with a projection at one end for holding in place. The table is printed on a composition card of about 2x5 inches, giving information on the length of meter shanks for button head and countersunk rivets having a diameter of ⅜, ½, ⅝, ¾, ⅞ and 1-inch and with a grip from ½ to 6 inches.

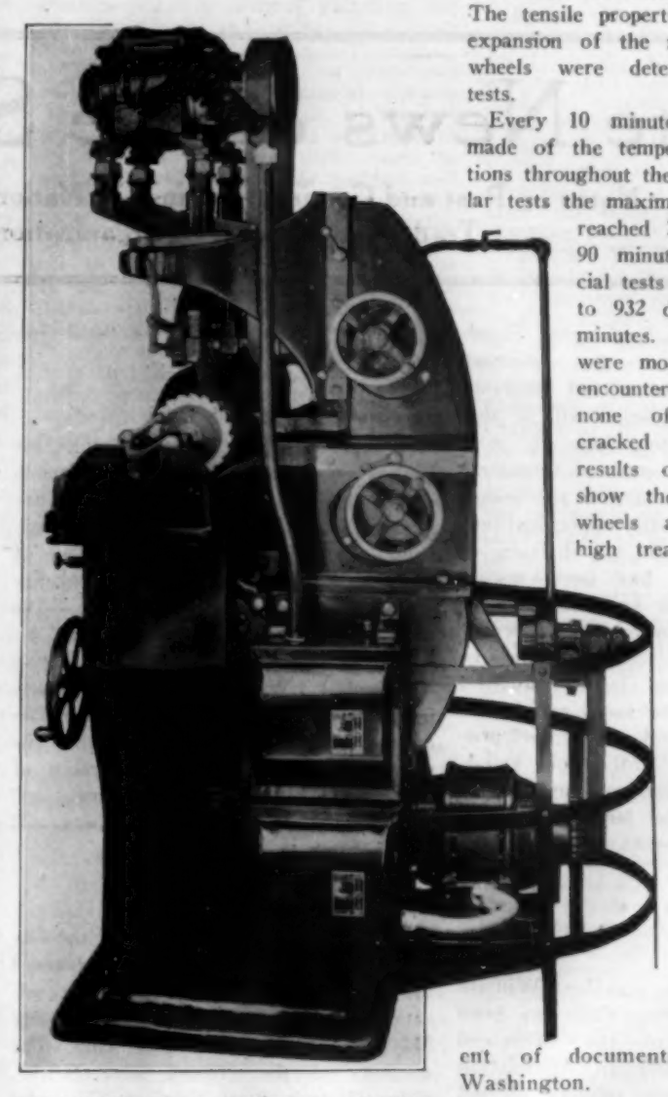
Develops Set of Gages To Check Micrometers

Increased convenience without the sacrifice of accuracy of earlier sets is claimed for a new set of microgages recently developed by the Van Keuren Co., 362 Cambridge street, Boston. The new gages are mainly for the purpose of checking micrometers and for direct use on parts being machined. The set contains 35 gages and over 140,000 different combinations are said to be possible. The different gages are as follow: 10 gages in ten thousandths, from 0.100-inch to 0.1009-inch; 9 gages in thousandths, from 0.101-inch to 0.109-inch; 9 gages in hundredths, from 0.120-inch to 0.200-inch and 6 gages as follows: 0.3, 0.5, 1.0, 2.0, 3.0 and 6.0-inch. It is unusual to have a 6-inch gage block, but this affords a convenient unit for increasing the range of existing sets of combination gages.

Investigate Stresses in Car Wheel Treads

An investigation of the stresses induced in steel car wheels from heating of the tread upon application of the brakes recently has been carried on by the United States department of commerce bureau of standards, Washington. The tests were conducted under circumstances as near as possible approaching actual conditions in service. Experienced railroad men say that the tread of car wheels becomes heated to a red heat from the continuous application of brake-shoes when descending long mountainous grades. A large number of rolled, forged and cast wheels were tested. The wheels tested were representative of the five methods of manufacture in common use. The wheels were mounted in such a way that the axle was kept cool by running water while the tread was heated by means of an electrical resistor close to but electrically insulated from the tread. Thermocouples were inserted at approximately 2-inch intervals to determine the temperature distribution, while the radial stresses developed in the plate on both the face and the back were indicated by means of strain gage instruments. The tensile properties and coefficient of expansion of the material used in the wheels were determined in auxiliary tests.

Every 10 minutes observations were made of the temperature and deformations throughout the wheel. In the regular tests the maximum tread temperature reached 716 degrees Fahr. in 90 minutes, and in the special tests the tread was heated to 932 degrees Fahr. in 150 minutes. Although the tests were more severe than those encountered in actual service, none of the wheels was cracked in the tests. The results of the investigations show the manufacturer how wheels are deformed from high tread temperatures, giving the magnitude and distribution of stresses throughout the wheels. The manufacturer will be able to use the new data in considering the question of changes in design and manufacturing practice. The complete results are contained in Technology paper No. 235, which may be obtained from the superintendent of documents, printing office, Washington.



AUTOMATIC HOB GRINDER HAVING MOTOR DRIVE AND HAND WHEEL ADJUSTMENTS

April Coke Exports Large

Washington, June 5.—Coke exports from the United States in April totaled 201,788 tons, valued at $2,291,187, a marked increase over the 28,413 tons valued at $243,417 of last April. In the 10 months ended with April exports amounted to 737,788 tons valued at $8,148,865. In the same 10 months ended with April 1922, coke exports were only 246,543 tons valued at $2,147,135 according to the United States department of commerce.

German Exports in 1922 and 1913 Compared

Berlin, May 24.—Figures have become available showing German exports of iron and steel to various destinations last year compared with 1913. They show vividly how much less important Germany now is in international steel trade than before the war. The exports to practically every country show a great falling off. The figures covering South America and Asia where American steel is competitive are interesting.

In 1913 Germany shipped 216,633 tons to Argentina, the figure for 1922 being only 122,023 tons. To Brazil in 1913 exports were 92,108 tons, and in 1922 30,016 tons. Germany shipped 52,640 tons to Canada in 1913 and nothing in 1922. Figures for other countries are as follows:

	Metric Tons	
	1913	1922
China	41,641	20,705
Japan	189,859	117,997
Italy	237,034	5,299
Sweden	149,617	52,323
Norway	94,255	35,532
Spain	43,794	16,774
Great Britain	1,057,411	107,712
Belgium	577,151	66,155
Holland	484,834	301,216

A strike of the 600 union iron molders in Worcester, Mass., has been averted. The men asked for an increase from $6 to $7.20 a day, which was refused and a compromise was effected. The amount was not stated.

Late News of the Societies

Notes on Past and Coming Meetings of National and Local Trade and Technical Organizations

THE American Engineering Standards committee, the American Railway association and other industrial and scientific bodies will be represented at Washington, June 11, at a meeting called by Secretary of Commerce Hoover to consider further the standardizing of commodity specifications. Mr. Hoover, through his division of simplified practice, has been urging industry to eliminate superfluous sizes. Now he proposes to issue a directory of specifications, so that the railroads, the government and large industrial buyers will take the same article for the same purpose and not compel producers to deviate slightly from standard practice for individual buyers. Director Burgess of the bureau of standards is working with Mr. Hoover in this project.

* * *

Elect Officers

William H. Evers, president William H. Evers Engineering Co., has been elected president of the Cleveland chapter of the American Association of Engineers. Other officers elected are as follows: J. A. Casper, vice president; Tom J. Brennan, secretary; S. W. Evarts, treasurer; Edward Horner, director.

* * *

Organize as Local Section

The New Britain, Conn., branch of the Connecticut section of the American Society of Mechanical Engineers, held its annual meeting May 24, when the following officers were elected: Chairman, B. S. Lewis; vice chairman, C. T. Hewitt; secretary and treasurer, A. L. Stowell. It was voted to discontinue as a branch and organize as a local section.

* * *

Discusses Pulverized Coal

A paper entitled "Pulverized Fuel for Boilers" was presented at a joint meeting of the mechanical section of the Engineers' Society of Western Pennsylvania and the Pittsburgh section of the American Society of Mechanical Engineers, Tuesday evening, June 5. The authors were J. C. Hobbs, manager Allegheny county for the Steam Heating Co., and L. W. Heller, general superintendent of power stations of the Duquesne Light Co., Pittsburgh. The meeting was held in the ball room of the William Penn hotel, Pittsburgh, and was largely attended by members and guests of both organizations.

* * *

Hold Annual Meeting

Approximately 200 members of the Detroit Foundrymen's association observed the twentieth anniversary of the organization with an annual banquet meeting May 24 at the Michigan club. The speakers of the evening were S. W. Utley, Detroit Steel Castings Co., who discussed the principle of the open shop; Pat Dwyer, *The Foundry*, Cleveland, and T. F. L. Henderson, LaSalle Extension university, Chicago. The following officers were elected for the coming year: President, K. C. Babo, Dodge Bros.; vice president, Robert Crawford, Atlas Foundry Co.; secretary, D. R. Hay, Sanford Riley Stoker Co.; treasurer, Fred A. Cowen, Osborn Mfg. Co.

* * *

Foundrymen Elect

The Pittsburgh Foundrymen's association at its recent annual meeting elected these officers for the ensuing year: President, John W. Guay, Fort Pitt Steel Casting Co., McKeesport, Pa., to succeed Samuel B. Guthbert; vice president, Ralph W. Jones, Union Switch & Signal Co., Swissvale, Pa., to succeed Mr. Guay; secretary-treasurer, William J. Brant, Bessemer building, Pittsburgh, re-elected.

This new executive committee was appointed: Samuel B. Cuthbert, Carnegie Steel Co., Braddock, Pa.; L. B. Snow, Hickman-Williams Co., Oliver building, Pittsburgh; Gustav A. Bauman, Jones & Laughlin Steel Corp, Pittsburgh; B. F. Mercer, Union Steel Casting Co., Pittsburgh; and L. V. Stevens, Locomotive Stoker Co., Pittsburgh.

Convention Calendar

June 7—National Association of Sales Managers. Convention at Atlantic City, N. J. Charles F. Abbott, 26 Madison avenue, Montclair, N. J., is chairman.

June 7-9—The Taylor society. Annual meeting at the Hotel Onondaga, Syracuse, N. Y. H. S. Person, 29 W. Thirty-ninth street, New York, is secretary.

June 11-14—Electric Power club. Annual meeting, Hotel Homestead, Hot Springs, Va. S. N. Clarkson, Kirby building, Cleveland, is secretary.

June 14-15—American Society for Steel Treating. Spring sectional meeting, Hotel Bethlehem, Bethlehem, Pa. W. H. Eisenman, 4600 Prospect avenue, Cleveland, is secretary.

June 20-23—American Institute of Chemical Engineers. Summer meeting at Wilmington, Del. J. C. Olson, Polytechnic institute, Brooklyn, N. Y., is secretary.

June 25-29—American Society for Testing Materials, annual meeting at the Chalfonte-Haddon hall hotel, Atlantic City, N. J. C. L. Warwick, 1315 Spruce street, Philadelphia, is secretary.

June 25-29—American Institute of Electrical Engineers. Annual convention at Swampscott, Mass. F. L. Hutchinson, 33 West Thirty-ninth street, New York, is secretary.

Sept. 24-28—American Association of Iron and Steel Electrical Engineers. Convention and exhibition, Auditorium, Buffalo. Headquarters of the association are located at 1007 Empire building, Pittsburgh.

Preparing for War Production

Government Plans To Have Industries Ready To Make Munitions without Delay— Will Negotiate Contracts in Peace-time and Seek To Specify Fixed Prices— How This Will Affect Iron and Steel Manufacturers Explained

WASHINGTON, June 5.—Plans of the war department for preparing industrial plants of the United States for the transition to war production immediately a state of war is declared, have reached the point where forms of contracts, after having been submitted to industrial interests for criticism and suggestion, are approaching their final state. So far as possible the munitions for the next war in which the United States is engaged will be produced on a fixed price basis and according to terms now being laid down.

The United States has been divided into 13 ordnance districts, presided over by 13 district chiefs, all of whom are civilians. Under these district chiefs are executive assistants, all of them regular army officers. These assistants are surveying the industrial plants in their districts to determine their suitability and capacity for war production. The target the war department is aiming at in its campaign of industrial preparedness is this:

The department will have intimate knowledge concerning every industrial plant of the country capable of being utilized in a war emergency. Plant owners likewise will know their possibilities and, as a matter of course, their duty. The forms of contracts now being drafted will govern all war production. The stage will be set so that directly hostilities begin, a telegram from the department at Washington will suffice to turn these plants to the production of the prearranged munitions.

No time will be wasted negotiating contracts. This will insure an immediate flow of war materials. Since specifications of the desired war materials will have been known long in advance, there will be no lull in which material prices might embark upon a runaway market, and the prices to govern will be those then current, or very near that level. As Assistant Secretary of War Dwight F. Davis explained it a few days ago in addressing the district ordnance chiefs:

"In planning for the production of munitions, you ordnance gentlemen are considering measures to reduce the time interval required to obtain maximum production in order to meet the needs of the war army. As you succeed in doing this, so the financial burden of maintaining our war reserves in time of peace will be reduced, because if you can so plan with industry to get into production in vital munitions three months earlier than is possible without planning, the war department can reduce its reserve accordingly.

"This early production of munitions reduces the postwar financial burden. An examination of the cost of the last war and the sum which in consequence we are now burdened with seems to indicate that this postwar burden will be reduced at a rate in excess of $1,000,000 for each hour clipped from the date of the ending of the war. If we are to place our orders for munitions at the very outbreak of war we can place them with qualified industry at current prices. This will tend to stabilize prices and services. I also believe that our proposed war contracts will practically eliminate the chances of profiteering against the government."

To the Bethlehem Steel Co., American Car & Foundry Co., Pressed Steel Car Co., Scovill Mfg. Co., American Multigraph Co., Wagner Electric Co., Warner & Swasey Co., and similar interests the war department has submitted its fixed price contract. Under this form the contractor "shall deliver to the United States the articles or render the services hereinbelow described, in accordance with all the conditions, specifications and drawings hereto annexed or referred to, all of which are expressly made a part of this contract at the prices stated."

On priority this form states: "The contractor shall give this contract precedence over all contracts not directly connected with war activities and as among federal contracts, in the order of dates of approval thereof, or in accordance with other priority established by competent authority." Subcontracting is not to be done without the permission of the department, and where subcontracts are permitted they shall be terminated coincident with the main contract. It is stated further: "The liability of the contractor to the subcontractor shall in no case exceed the contract price for all finished articles or work accepted by the United States, and such part of the expenses for labor, materials and overhead as is properly applicable to all partly finished articles or work and parts thereof otherwise acceptable, in process on date of notice of termination, and not required by the United States."

Other important clauses in this fixed price contract, which would largely govern the iron and steel and allied industries in case of war, are:

Article V. Cost Accounting: For the purpose of facilitating final settlement by the United States, the contractor shall keep all costs connected with the performance of this contract under the headings and in the manner prescribed by the war department. Such records shall be preserved by the contractor for a period of two years after the final settlement under this contract.

"Article V. Cost Accounting: For 30 days after the date of this contract, the contractor shall file with the contracting officer, a list of all property and of all changes in plant with the cost thereof, which he proposes to amortize in whole or in part in full performance of this contract. Subsequent changes in this list may be made with the approval of the contracting officer. This list, when approved by the contracting officer, shall be the basis for the settlement of all claims for unamortized expenses in the event of termination of work before completion under Article XII of this contract.

"Article VII. Changes of Drawings and Specifications: The United States may, by a written order to the contractor at any time, make reasonable changes in the drawings, specifications, conditions of delivery or other provisions in this contract. The contract price or compensation for any articles manufactured or work performed in accordance with such changes shall be modified to conform to any increase or decrease in the cost of manufacture or performance due to such change. Any necessary changes in time of performance and amount of increase or decrease in price or compensation caused by such changes shall be determined by agreement between the contractor and the contracting officer.

"Article VIII. Inspection: The articles or work are subject to observation, inspection, and tests by the United States at any and all times during manufacture or performance, in order to determine their compliance with the requirements of this contract, and are subject to acceptance or rejection by the United States. For these purposes the United States may maintain an inspector or inspectors at the plants or places where and during the time this contract is being performed. Such inspectors may reject any and all articles or work, or components thereof, and materials found not to be in compliance with the requirements of this contract. No preliminary test or inspection shall preclude the United States from rejecting any articles or work upon final inspection or test at completion. The contractor shall furnish all reasonable

facilities and assistance requested by such inspectors for the performance of their duties. Inspection and tests by the United States shall be carried out in such a manner as not unduly to delay the performance of this contract by the contractor. Nothing contained in this article shall limit or annul any inspection or test which may be called for by the drawings and specifications forming a part of this contract. No inspection, acceptance, or payment under this contract shall deprive the United States of any claim against the contractor hereunder, by reason of fraud or deception, or by reason of latently defective articles, materials or workmanship.

"The contractor shall from time to time, and whenever so requested, furnish to the contracting officer or to such person as the contracting officer may designate, statements and reports on the progress of the performance of this contract and full information on all factors relating to deliveries or performance hereunder.

"Article IX. Payments: Payments shall be made at such times and in such amounts as the officer in charge of the work may elect, based upon estimates made by him of the percentage of completion of the contract. Ten per cent of such estimates shall be retained until the final completion of this contract and acceptance by the government of all work done thereunder, except as provided in Article XII; provided, that upon completion and acceptance of each separate building, vessel, distinct public work or group or lot of supplies hereunder, for which the cost is stated separately, payment thereof may be made in full, including the retained percentages thereon, if so completed on or before the time stipulated.

"Article X. Failure and Delay, Etc.: In the event of the contractor's failure at any time to carry out the provisions of this contract, or to make satisfactory progress toward its completion, the contracting officer may, by giving written notice to the contractor, proceed under any or all of the following options:

1.—Permit the contractor to proceed with the performance of the contract, under such supervision at the contractor's plant, as the contracting officer may elect to exercise.

2.—Proceed at the contractor's plant to complete the work contracted for, or any part thereof, and for this purpose, take possession of and use any or all of the plant, properties and supplies of the contractor, necessary for the performance of this contract.

3.—Purchase or procure from other sources, the articles or services necessary to complete the contract, in such manner as may be deemed best for interests of the public services.

4.—Cancel the contract as to any or all of the uncomplete portions thereof.

"In case of proceeding under any or all of the above options, any excess cost over the contract price that may result from the contractor's failure or delay shall be at the expense of the contractor. The contractor, however, shall not be held responsible for delays in the performance of this contract which in the opinion of the contracting officer, were due to causes beyond the control of the contractor, and which could not have been prevented by the exercise of proper effort and business foresight on the part of the contractor; provided, that the contractor shall have promptly and fully notified the contracting officer in writing of any actual or anticipated cause of delay. The contracting officer will then inform the contractor in writing, as promptly as practicable, of his ruling as to the validity of the alleged cause and the extent of delay justified thereby.

"Article XI. Adjustment of Claims and Disputes: Except as otherwise specifically provided in this contract, any claims, doubts, or disputes upon matters of fact concerning or arising out of this contract, or as to its performance or non-performance, and which are not disposed of by mutual agreement, shall be referred to the chief of the branch named at the head hereof, for determination, and his decision shall be binding and conclusive as to any question, matter or thing so submitted.

"Article XII. Termination Clause: Should the war need cease or the public interest require it, work under this contract may be terminated by the United States at any time upon notice in writing from the contracting officer to the contractor. Such termination of work shall be effective upon the date specified in the said notice and shall be without prejudice to any claim which the United States may have against the contractor under Article XI. Immediately upon receipt of such notice, the contractor shall discontinue the placing of all orders for materials, facilities and supplies in connection with the performance of this contract, and shall take the necessary steps to cancel all his existing orders and terminate work under all subcontracts.

"As a full and complete consideration for the termination of work under this contract as hereinabove provided, unless the contractor has been held responsible for failure or delay as provided in Article X, the United States shall, at the time of such termination:

1.—Pay to the contractor the full contract price or compensation for all articles accepted, services rendered or work completed in accordance with the terms of this contract, and not previously paid for.

2.—Reimburse the contractor for all expenditures not included in payments previously made, which had actually been made specifically and necessarily for this contract prior to the receipt by him of notice of termination of work, and for such payments as may subsequently become necessary to effect settlement of all orders and subcontracts necessarily placed for this contract; provided, such orders and sub-contracts shall have been placed and shall be settled on the basis of the settlement with contractor herein provided, and with the minimum of expense to the United States. All raw materials, articles in process of manufacture, and other property covered by payments made under any of the terms of this contract shall become the property of the United States, provided, that if the contractor shall have acquired buildings, or parts of buildings, plants, facilities, or equipment solely or in part for the purpose of this contract and not intended or required by him for his future business, or the contractor shall have made changes in his plant which will require expenditures for rehabilitation before resumption of his usual work, or incurred other expenses necessary to this contract and property intended to be amortized thereunder, he shall be paid such part of his expenditures, therefore, as the uncompleted portion of the contract bears to the total contract, less the salvage value of all property involved. He shall also be reimbursed for such portion of the salaries, for 30 days after date of termination of work, of the administrative overhead retained by him strictly for his future business, as was properly chargeable to the terminated work, but no portion of the overhead thus paid shall be included in rehabilitation or other claims for reimbursement.

3.—In the event that the notice of termination of work shall require the immediate cessation of any or all work under this contract and it becomes necessary because of the abrupt cessation thereof, to discharge promptly, any or all of the employes actually engaged upon the termination of work at the date of notice of termination of work, the contractor shall pay to all employes so discharged salaries or wages for 45 working days after discharge (or to date fixed in Article II for the completion of the contract if less than 45 days) at two-thirds of the straight rates of pay individually received by them at the date of notice of termination of work. The contractor shall be promptly reimbursed for such expenditures upon the presentation of properly signed and certified pay rolls covering such payments; **provided,** that no reimbursement shall be made for payment to an employe for any portion of the 45 days during which he shall have been re-employed by the contractor.

4.—Upon all payments under this contract made by the contractor subsequent to the date of termination of work, he shall be allowed interest at 6 per cent per annum for the period during which any such payment is delayed beyond 60 days after date of termination of the work.

5.—The contractor shall, without additional compensation, place in storage within his plant, and give adequate protection to all property of the United States in his plant, and provide such office space as may be required by the contracting officer and his force at the plant for .... months after the termination of work under this contract, and will thereafter lease the storage required by the United States at not to exceed $.....per square foot per month for a period of not to exceed six months.

6.—The contractor may with the approval of the contracting officer, be permitted to take over such property of the United States as he may desire for his peacetime activities, at the prevailing market price, or if none be ascertainable, at a price not greater than the initial cost to the

United States.

"Article XIII. Responsibility for Supplies Tendered: The contractor shall take such steps as may be directed by the contracting officer to protect materials and finished articles from damage from fire, theft, storm or other cause, but this requirement shall not be interpreted as requiring the contractor to provide himself with insurance policies covering such losses. If the contractor delivers material in compliance with all conditions of this agreement to the designated point, and the goods are stored in government warehouses pending final inspection and acceptance or rejection, the United States shall assume responsibility for the material, but the contractor shall bear all risk on material rejected, after the notice of rejection."

Practical Test Planned

The contract is now before the judge advocate general of the war department for his approval as regards legality, but it is substantially in final form. When finally approved, it will be generally distributed throughout the iron and steel industry. From the experience of the last war, the department has learned that it should attempt to concentrate ordnance production within iron and steel industry and not hand out contracts indiscriminately to interests believing they can acquire a plant and embark upon a new line.

At the next session of congress the department will seek a small appropriation for educational work, in order to keep alive the art of ordnance making. To a plant suitable for making small arms, for example, the department would like to deliver several rifles, with the necessary blueprints and specifications, and let the plant make several hundred in a slack period. This would acquaint labor with the various operations and enable the plant owner to figure somewhat on costs. The owner could estimate what equipment and buildings would be needed for wartime expansion. For this educational work the department would pay only the actual costs.

Through the work done in arsenals the department at all times has a fairly accurate idea of costs. Because of the protests from every quarter and the claim that nothing sends up prices so quickly as competitive bidding, this is to be eliminated so far as possible. The ordnance section of the department will probably seek to obligate producers to stated prices; that is, in peace time virtually contract to produce munitions at certain levels during the first six months of hostilities, but to this plan producers probably will object strenuously. By the use of priority orders and the absolute control of raw materials which the department can invoke at any time, the department expects to be able to swing into line recalcitrant producers, especially those holding out for high prices.

The fixed price contract will be used wherever possible. But the department visualizes the situation whereby a development in actual hostilities would require new equipment, and in this case the department would in effect have to ask industry to try its hand and report its costs. To meet this situation a sort of flexible price contract is being framed. A third form of contract, also to eliminate cost-plus, is explained in the following statement by Brig. Gen. W. S. Peirce, assistant chief of ordnance:

"It is a combination construction and operation contract, the operation clauses only coming into force in those cases where the government desires the contractor to extend his work into the field of operation as might be the case in technical manufacturing plants.

"There is neither fee nor profit. Attempt has been made to so word the contract that contractors cannot suffer any loss but on the other hand will receive full reimbursement for all money properly expended. It is based on the supposition that the large contractors of the United States are not only willing to give the government the advantage of their experience, equipment, and organization from patriotic motives but that they would be so situated with reference to other work that they would welcome this opportunity of keeping their organization intact and in good working order until the time when they will be in a position to resume commercial operations.

"Contractors' equipment will not be rented, but such portion of it as can be utilized on the work involved will be purchased outright at an agreed appraised value. Conversely, the contractor is given the option of repurchasing this equipment or its equivalent upon the completion of the job. This provision avoids the difficulties encountered under the old cost-plus form and still makes it possible for a contractor to equip himself when he has finished the government work."

General Peirce, in addition to being assistant chief of ordnance, also is chief of manufactures and thus is doubly charged with war planning. He presides over the war contracts board, which has representatives from each branch of the service and has met weekly for 18 months in planning industrial preparedness. The district ordnance chiefs are: Howard Bruce, Baltimore; C. H. Tenney, Boston; B. A. Franklin, Springfield, Mass.; E. A. Russell, Chicago; C. M. Harrison, Cincinnati; Bascom Little, Cleveland; John R. Delafield, New York; John C. Jones, Philadelphia; R. A. Dravo, Pittsburgh; M. E. Singleton, St. Louis and Bruce Cornwall, San Francisco. Chiefs for the Detroit and Rochester, N. Y., districts have not yet been designated. Messrs. Tenney, Franklin, Harrison, Little and Delafield are colonels in the reserve corps, while Mr. Cornwall is a lieutenant colonel.

India's Pig Iron Capacity Exceeds Demand

New York, June 5.—Charles Page Perin, of C. P. Perin & S. M. Marshall, who has just returned to this country after six months in India, says there is little likelihood of any further marked expansion of iron and steel capacity in that country. The present pig iron producing capacity in India is beyond the ability of the country to consume and India is dependent upon the export market in pig iron. The steelmaking capacity, which is confined to the Tata Iron & Steel Co., is sufficiently large to meet the present requirements of India. Mr. Perin says that the recent failure of the Alliance bank of Simla had a very disturbing effect, even though the failure was not unexpected. Nevertheless, the financial situation in India generally has improved materially.

On his trip home, Mr. Perin spent some time in Italy, France and England and said that he found conditions everywhere improved. In Italy he said, there are hopes of building up a great selfcontained iron industry based on the waterpower of that country. In addition to the present extensive hydroelectric plants in Italy, further developments are planned, and it is believed that electrolytic iron will be produced in that country. Italian engineers, said Mr. Perin, are coming to the United States to study the methods perfected here in the electrolytic production of iron.

Truscon Offers Stock

Holders of common stock of the Truscon Steel Co., Youngstown, O., will be given first opportunity to purchase 100,000 shares of additional common stock of $10 par value at $15 a share. Stock not taken by June 10 by stockholders will be sold to a banking syndicate. Directors of the company have declared a 2 per cent dividend, payable June 15, and have announced that a 3 per cent dividend will be paid Sept. 15. The common stock will be placed on a 12 per cent basis. The par value of the company's preferred stock has been increased from $10 to $100.

Engineers Hold Meet in Canada

Annual Spring Meeting of American Society of Mechanical Engineers Is Largely Devoted to Discussion of Problems Dealing with Development of Canadian Resources—Hydroelectric Works and Port of Montreal Visited

LOCAL applications of the principles of engineering and management received unusual attention at the annual spring meeting of the American Society of Mechanical Engineers, Montreal, May 28-31. Not only did the technical program abound with papers dealing with problems of Montreal and Canada, but much of the time of the 300 engineers attending the convention was devoted to inspecting the public and private engineering and industrial works in and near the Canadian city.

The meeting opened Monday morning with registration and meetings of the council and committees. In the afternoon a brief business session was held, John L. Harrington, president of the society presiding. Calvin W. Rice, secretary, talked interestingly of observations he made while visiting South America as a representative of various American engineering societies. He emphasized the fact that engineers in many of the South American republics are fully alive to modern problems and that the standard of engineering is much higher than is generally supposed by Americans.

The technical sessions, held on the mornings of Tuesday, Wednesday and Thursday, covered the important problems of hydroelectric power development, modern port construction and transportation, as well as of industrial management, fuel, dynamics, power economy and steel fabrication. The inspection trips held during the afternoons served to supplement many of the technical papers dealing with local problems. Among the points visited were the Angus shops of the Canadian Pacific railroad, Montreal harbor, the properties of the Cedar Rapids Mfg. & Power Co., and the plant of the Dominion Engineering Works, Lachine.

During the meeting hearings on power test codes and the boiler code were held. Following the policy first carried out at Atlanta a year ago, the nominating committee held open sessions for the purpose of encouraging members to suggest nominees.

As is customary in the case of spring meetings of the society, entertainment held an important position on the program. On Tuesday evening a smoker was given by the Montreal branch of the Engineering Institute of Canada and on Wednesday evening the usual dinner dance was held.

Discuss Engineering and Management Problems

PERHAPS the paper most closely related with the iron and steel industry was that presented by H. F. Naylor, assistant works manager, Angus car shops of the Canadian Pacific railroad, Montreal, Que. Mr. Naylor described a shop erected in 1909 for the fabrication of steel freight cars. After reviewing the development of freight cars and stating the reasons why steel was selected instead of wood, he outlined the principal machine equipment of the shop. This includes four automatic spacing punches, five coping punches, five highspeed punches, two horizontal punches, one gate shear, one angle shear, one 36-foot plate edge planer, one 30-inch circular saw, one 30-inch metal band saw, one 7-foot plate roll, one 10-foot brake, one bulldozer, two special plate drilling machines and miscellaneous drill presses. The shop is well equipped with traveling cranes.

Use Jigs In Assembling

According to Mr. Naylor the erecting of steel frame box cars by the jig method was originated at the Angus shops. By this method the under frame, side frames and end frames are assembled on jigs as complete units ready for the final assembly of the car. The jigs consist of cradles by means of which the various members are accurately placed and held in proper relation to each other until they are riveted together. The jigs dispense entirely with the need for checking for squareness, alignment and location of connection holes, thereby simplifying the final assembly.

Another paper presented under the auspices of the railway section of the society was "Notes on Recent Developments in Railway Motor Cars" by C. E. Brooks, Canadian National railways, Toronto.

Problems in the application of management engineering to the paper industry were outlined by R. B. Wolf, R. B. Wolf Co., New York. He pointed out that one of the most difficult problems is to overcome the resistance of practical operators in paper mills to the introduction of scientific manufacturing methods. As is the case in all industries, the paper mill manager must depend upon superintendents, department heads, foremen and others for carrying out his ideas. Without such co-operation the introduction of the principles of management engineering is difficult.

Another paper relating to industrial engineering was presented by M. A. Lee, Cornell university, Ithaca, N. Y. Mr. Lee outlined the circumstances which led to the inauguration of a course in industrial management at Cornell, and then described the experience gained thus far in administering the course. He stated that it became necessary to broaden the course, supplementing the lectures with practical training in the laboratory and drafting room. He advocated a training in the engineering phases of problems of manufacturing as a necessary part of the education of a student in industrial management.

Describes Uses of New Fuel

O. P. Hood, general mechanical engineer, United States bureau of mines, Washington, presented a paper on the production and possibilities of lignite char, which is a lignite which has been dried and distilled in an oven. It is explained that about 2½ tons of raw lignite are required to make one ton of char, the heating value of which is about 12,000 B.t.u. per pound. Mr. Hood outlined some of the factors affecting the production and marketing of this fuel on an economic basis in competition with coal.

Carl R. Soderberg, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. pre-

pared a paper covering recent developments in balancing machines. The need for greater refinement in balancing high-speed rotating parts such as are in small motors has been receiving greater attention owing to the large number of applications of these units. In many plants the practice is to test the rotor on parallel knife edges and to grind off metal on the "high" side. The method suggested by Mr. Soderberg involves the use of a balancing machine with a movable fulcrum. He explained the use of the machine.

Papers dealing with the more technical phases of engineering included one by P. P. Dean on "Sectionalization and Remote Control of High Pressure Steam Lines"; a paper on chimney design by Alfred Cotton, Heine Safety Boiler Co., St. Louis; "Modern Hydraulic Turbines of Large Capacity" by H. G. Acres; and "Stresses in Curved Tubes by Rectangular Cross Section" by S. Timoshenko.

Outlines Power and Port Development in Canada

EMPHASIS was placed upon the great resources in Canada for the development of hydroelectric power. At the Tuesday morning session, P. S. Gregory, assistant to Julian C. Smith, general manager, Shawinigan Water & Power Co., read a paper prepared by Mr. Smith on water power development in the province of Quebec. He called attention to the fact that Quebec has an area one-quarter that of the United States and that its potential water power, due to precipitation, is 10 per cent higher than that of the United States. He estimated that the potential electrical energy of the province is from 13,000,000 to 15,000,000 continuous kilowatts. The available commercial water power is approximately 12,000,000 horsepower at 50 per cent load factor. At the present time the total power developed aggregates slightly over 1,000,000 horsepower. F. A. Gaby, chief engineer, hydroelectric power commission of Ontario, Toronto, described the development of hydroelectric power plants in the province of Ontario.

Port Second in America

At the Wednesday morning session Fred W. Cowie, consulting engineer to the Montreal harbor commission, described the development of the port of Montreal. He emphasized the importance of Montreal as a gateway for Canadian wheat and stated that the port ranks sixth in size in the world and second in America. He outlined the difficulties that must be overcome in the development of the port, one of the principal items being the expenditure of $35,000,000 in many years for dredging canals in the St. Lawrence river. In reply to a question by W. S. Jacobs, the Walton Co., Hartford, Conn., Mr. Cowie explained why the difference in design of Great Lakes and ocean-going steamships would make it impractical to interchange them even if an adequate water route from the lakes to the sea were available now. Augustus Smith, president, Bergen Point Iron Works, Bayonne, N. J., asked if the income from the port facilities at Montreal are sufficient to defray interest and operating charges. Mr. Cowie answered that the commission is proud of the fact that not only has the port been able to meet these fixed charges but has earned a slight margin.

J. A. Wilson, secretary of the air board, outlined the scope of airplane development in Canada. He confined his remarks principally to the control of flying and to the possibilities in using the airplane in peace time pursuits. He stated that during recent years the airplane had been used to make forest surveys, as fire patrols, for aerial photography and for investigating the natural resources. He estimated that at the present time 25,000 square miles of Canadian forest land are patroled by observers equipped with airplanes.

Place Orders for Motors

Mill motors control apparatus and a switchboard, amounting to approximately $70,000 have just been ordered by the American Rolling Mill Co., Middletown, O., from the Westinghouse Electric & Mfg. Co., East Pittsburgh.

Another order recently received by the Westinghouse company amounted to about $375,000 from the Inland Steel Co., Chicago, to be used in connection with the enlargement of its mills. This electrical equipment consists of one 1500-horsepower wound rotor motor for finishing stand of sheet bar mill; one 6250-horsepower wound rotor motor for 24-inch continuous billet mill; five 1000-kilowatt synchronous converters with transformers; and one 12,500-kilovolt-ampere turbine generator unit with a 15,000 square foot surface condenser.

Orders Furnace Equipment

The McKinney Steel Co., Cleveland, has placed contracts with Arthur G. McKee & Co., Cleveland, for equipment which will be installed in connection with the rebuilding of blast furnaces Nos. 1 and 2 at its River furnace plant. These orders include a McKee-type revolving distributor for each furnace, with automatic electric control, as well as electric rigs for automatically operating the furnace bells. The McKee company also is furnishing five Kling-type goggle valves for controlling and by-passing the gas supply of the two new furnaces.

Expected Rate Reductions Not Near at Hand

Washington, June 5.—Government officials are apprehensive lest reports that freight rates are shortly to be reduced act as a deterrent to business, which appears to be picking up after the recent hesitancy. It is probable that rates will eventually be reduced and that maintenance of the recent good earnings by the carriers will speed the reduction. But before a lowering of rates comes the interstate commerce commission must initiate an investigation and the carriers must have their day in court—a process that could easily consume six months. March earnings of the carriers averaged 5.84 per cent, while April earnings will approximate that figure. The rates now in effect were designed by the commission to give the railroads a 5¾ per cent return. The best opinion here at this time is that barring individual adjustments the present level of rates will carry through 1923.

Delay Inquiry Into Costs

Washington, June 5.—The European situation continues to becloud the plans of the tariff commission to ascertain pig iron and steel production costs. Chairman Marvin of the commission has been in consultation with President Harding concerning some tariff changes and studies, but no metal products figured in the conference. Because of the obvious difficulties of ascertaining pig iron costs abroad, the pig iron and steel questionnaires have not been sent out. The final decision as to obtaining steel costs has not been made.

Chicago-Milwaukee Rate On Pig Iron Raised

Chicago, June 5.—After being in existence for many years the freight rate on pig iron from Chicago to Waukegan, North Chicago, Kenosha, Racine and Milwaukee, has been increased from 76 cents to $1 per ton. The new rate took effect June 1. At the same time the minimum carload was increased from 17 tons to 40 tons.

The old rate was kept down by the potential water competition by way of Lake Michigan, although iron transported by barge from Chicago could be delivered in the lake shore cities only by transfer to trucks, at a cost greatly in excess of the rail rate.

The Chicago & Northwestern and the Chicago, Milwaukee & St. Paul railroads carry all the pig iron from Chicago furnaces to the north short towns. It originated on roads serving the Calumet district of Chicago, and the delivering road was forced to absorb about 44 cents per ton in switching charges, leaving little to repay it for the 50 to 80-mile haul to destination.

The effort to increase the rate has been in progress for several years and has been resisted by shippers and consumers. Now that it has been allowed by the interstate commerce commission no attempt will be made to have it changed as the shippers understand that the railroads carried the business at a loss.

Sale of the Hanna & Windsor Castings Co., Windsor, Ont., to the Consolidated Stamping & Mfg. Co., Sarnia, Ont., recently was announced by Arthur Fitzgerald, who recently became assignee of the Castings company. The plant will be reopened June 15.

Sheet Extras Are Simplified

A simplified method of presenting width and length extras for black and galvanized sheets has been worked out by the Republic Iron & Steel Co. In this form consultation of the list is facilitated and the extras which the various gages carry for different dimensions of width and length are clarified. The extras for width and length for black and galvanized sheets given below by this method of tabulation are a part of the revised standard differentials and extras applying to all grades of sheets which leading manufacturers have adopted and have had effective dating from April 26.

Black Sheets

EXTRAS FOR WIDTH

Gages	Under 12 inches to 6 inches	Under 24 inches to 12 inches	24 inches to 32 inches	Over 32 inches to 36 inches	Over 36 inches to 40 inches	Over 40 inches to 44 inches	Over 44 inches to 48 inches
10 to 16	0.20	0.10	Base	Base	Base	Base	Base
17 to 18	0.25	0.15	Base	Base	0.05	0.05	0.05
19 to 21	0.25	0.15	Base	Base	0.15	0.15	0.25
22 to 24	0.25	0.15	Base	Base	0.20	0.40	0.40
25 to 27	0.30	0.20	Base	Base	0.20	0.40	...
28	0.30	0.20	Base	0.10	0.40	...	...
29 to 30	0.30	0.20	Base	0.10	...	...	...

EXTRAS FOR LENGTH

Gages	Under 30 inches to 18 inches	Under 60 inches to 30 inches	60 inches to 124 inches	Over 124 inches to 144 inches
10 to 16	0.15	0.10	Base	Base
17 to 18	0.25	0.15	Base	0.10
19 to 21	0.25	0.15	Base	0.10
22 to 24	0.25	0.15	Base	0.10
25 to 30	0.30	0.20	Base	0.10

Galvanized Sheets

EXTRAS FOR WIDTH

Gages	Under 12 inches to 6 inches	Under 24 inches to 12 inches	24 inches to 32 inches	Over 32 inches to 36 inches	Over 36 inches to 40 inches	Over 40 inches to 44 inches	Over 44 inches to 48 inches	Over 48 inches to 52 inches	Over 52 inches to 54 inches
10 to 15	0.25	0.20	Base	Base	Base	0.10	0.20	0.30	0.40
16	0.25	0.20	Base	Base	0.10	0.10	0.20	0.35	0.50
17 to 18	0.30	0.20	Base	Base	0.10	0.10	0.20	0.35	0.50
19 to 21	0.30	0.20	Base	Base	0.20	0.30	0.40	0.50	0.75
22 to 24	0.30	0.20	Base	Base	0.20	0.40	0.60	...	...
25 to 26	0.35	0.25	Base	Base	0.30	0.60	...	...	...
27	0.35	0.25	Base	0.10	0.50	0.75	...	...	...
28	0.35	0.25	Base	0.20	0.60	...	...	...	...
29 to 30	0.35	0.25	Base	0.20	...	...	...	...	...

EXTRAS FOR LENGTH

	Under 30 inches to 18 inches	Under 60 inches to 30 inches	60 to 124 inches	Over 124 inches to 144 inches	Over 144 inches to 168 inches	Over 168 inches to 180 inches	Over 180 inches to 192 inches	Over 192 inches to 216 inches	Over 216 inches to 228 inches
10 to 12	0.20	0.10	Base	Base	0.50	0.60	0.60	0.75	1.00
13 to 14	0.20	0.10	Base	Base	0.50	0.75	0.75	1.00	1.50
15 to 16	0.20	0.10	Base	Base	0.50	0.75	...	...	...
17 to 24	0.30	0.20	Base	0.10	...	...	...	...	...
25 to 30	0.35	0.25	Base	0.10	...	...	...	...	...

Examiner Finds Freight Rates Unreasonable

Washington, June 5.—Freight rates on numerous commodities, including tin and terne plate and iron and steel articles designated "special iron" in southern classification, from Buffalo and Pittsburgh and points taking the same rates to Nashville, Tenn., are unreasonable to the extent they exceed the aggregate of the intermediate rates, an examiner for the interstate commerce commission has ruled in the complaint of the Nashville Traffic bureau against the Louisville & Nashville railroad.

The examiner also recommends that the rates on tin and terne plate and "special iron" from Cleveland, Detroit and Toledo to Nashville since July 1, 1922, be found unreasonable to the extent they have exceeded 43, 44 and 42 cents respectively. On cotton ties the examiner's recommendation is parallel, except that the rates are 1 cent less. Rates prior to July 1, 1922, also are found unreasonable and appropriate reparation is recommended. On tin and terne plate in bulk from Pittsburgh to Nashville the examiner holds that the rate should be the same as for boxed.

Coal Case Hearing June 11

Washington, June 5.—The federal trade commission on June 11 at St. Paul will begin taking testimony in its complaint against the Northwestern Coal Dock Operators' association, charging the association with conspiracy to suppress competition in the coal trade in the upper lake region in violation of the Clayton and federal trade acts. The hearing will be in charge of Examiner Baggarly. Because it follows so closely the issuance of the complaint, the association's answer will not be filed until immediately preceding the hearing. Ten large coal companies with headquarters at Cleveland, St. Paul, Minneapolis, Pittsburgh and Sheboygan, Wis., are the defendants in the action.

Molders' Union Restrained

Terre Haute, Ind., June 5.—A temporary restraining order against interference by the International Molders' Union of North America with the business of the Terre Haute Malleable & Mfg. Co. has been issued by Judge A. B. Anderson, in federal court on petition of the company. A strike of molders in Terre Haute began May 5. It is charged that strikers have attacked nonunion employes and that they are conspiring to obstruct and destroy interstate commerce in the manufacture of castings for agricultural machines, automobiles and railroad equipment.

Mill Operations Cut by Warm Weather

Youngstown, O., June 5—Warm weather will cut down sheet and tin plate production in the Youngstown district this week. Of the 115 independent sheet mills scheduled for operation Monday morning less than 100 started. Tin mills are affected in the same way. Ninety Steel corporation mills and 31 independent mills were scheduled to start Monday but about 40 per cent of the units remained idle.

The number of active blast furnaces in the district was increased to 43 out of 46 with the resumption of the remodeled stack of the Sharpsville Furnace Co. at Sharpsville, Pa. Tuesday morning. One each of the cold furnaces belongs to the Republic Iron & Steel Co. at New Castle, Pa., the Valley Mould & Iron Co., and the Shenango Furnace Co. at Sharpsville, Pa.

Steelmaking shows no change, with the independents operating 47 of their 51 open-hearth furnaces and four bessemer converters, while the corporation has all of its 30 open-hearth furnaces and four bessemer converters going.

Bar mills show a decrease of one mill, the Youngstown Sheet & Tube Co. having suspended operation for its 12-inch merchant mill. Tube mills show an increase of one, as the same concern started its No. 10 mill which was remodeled and improved. All of the 17 pipe mills in Youngstown are now active.

Production of refined iron will show further decrease due to the warm weather. Scarcity of puddlers is more accentuated. Other mill operations remain unchanged in all departments.

Average operation of the independents is now figured at about 90 per cent of capacity, while corporation plants still are maintaining operations above 95 per cent capacity.

Revive Report of British Steel Merger

Reports have been revived in England linking Baldwins, Ltd., with the widespread interests of Guest, Keen & Nettlefords, Ltd., in a large merger of steel interests. The capital of the former is £8,500,000 and of the latter £13,300,000, involving approximately $100,000,000. Completion of the consolidation would unify a large part of the South Wales steel industry. Showing the large part of the industry concerned in the potential merger in South Wales. H. B. Allin Smith, assistant American trade commissioner of London has submitted the following table in a report to the department of commerce:

	Baldwin's	Guest-Keen	Combined	Total in South Wales
Blast furnaces....	11	14	25	34
Steel furnaces—				
Bessemer converters	..	5	5	11
Open-hearth	62	23	85	149
Iron puddling mills	4	28*	32	12
Rolling mills—				
Total	89	101	190	728
Sheet	36	61	97	153
Tin plate	34*	10	44	477

*Some outside South Wales, in the Midland.

In this area, according to Mr. Smith, are only two other groups of interests, the Ebbw Vale Steel, Iron & Coal Co, and Richard Thomas & Co. The latter controls a large tin plate equipment consisting of a sheet bar capacity of 340,000 tons a year and 14 tin plate works aggregating 111 separate mills with an annual capacity of 235,000 tons.

Make Changes in Design of Wood Surfacer

Improvement in the design of wood surfaces recently has been announced by the Oliver Machinery Co., Grand Rapids, Mich. In all the types manufactured by the company, the motor has been direct connected to the shaft of the cutting cylinder. This methor eliminates belting, and with the ball bearing surfacer a higher efficiency is obtained. A motor knife grinder, which operates from a lamp socket, is designed to operate on any surface planers or jounters manufactured by this company. This device grinds the knives while they are held securely in place in the cutting position in the heads. Frequent wheting and joining is a comparatively simple matter and it is easy for the operator to keep the knives sharp.

Feldspar Sales Larger

Washington, June 5.—Sales of crude feldspar in the United States in 1922 amounted to 114,200 long tons, valued at $812,400, or an increase of 24 per cent in quantity over sales of 1921 according to figures of the geological survey department of the interior. Of the nine states listed as producers of feldspar, Connecticut and Maryland are the only ones to show a decline in production in 1922 under that of 1921.

With liabilities of $5059.61 and assets of $4085 the Raine Mfg. Co., Worcester, Mass., manufacturer of blowers, recently filed a voluntary petition in bankruptcy.

Coke Production Shows Small Gain

Washington, June 4.—Production of beehive coke in the week ended may 26 showed a small increase, as compared with the week preceding according to the geological survey. On the basis of the number of cars loaded on the principal coke carriers the total output is estimated at 415,000 tons. The increase was chiefly in the Middle and Southern Appalachian regions, and a small gain was indicated for Pennsylvania and Ohio. The following table shows the compartive production of beehive coke by weeks:

	Week Ended May 26 1923(a)	Week Ended May 19 1923(b)	Week Ended May 27 1922
Pennsylvania and Ohio	334,000	333,000	70,000
West Virginia	23,000	23,000	6,000
Ala., Ky., Tenn. and Ga.	23,000	22,000	7,000
Virginia	20,000	17,000	6,000
Colorado and New Mex.	9,000	9,000	3,000
Washington and Utah..	6,000	7,000	3,000
United States total....	415,000	411,000	97,000
Daily average	69,000	69,000	16,000

(a) Subject to revision. (b) Revised from last report.

The production of bituminous coal has taken a spurt recently. From around 10,000,000 tons weekly at the beginning of May, the output had reached 11,046,000 tons in the week ended May 26. For the week ended June 2, the pace was maintained.

Japan's Iron and Steel Output Gains

Washington, June 5.—Japanese iron and steel production in 1922 registered a 17 per cent increase over the output of the preceding year according to statistics by the Japanese department of agriculture and commerce. The 1922 output totaled 2,392,835 metric tons and the 1920 total was 2,051,518 tons. Details of the production in 1921 and in the first half of 1922 appear below. Figures were unavailable for the output from July to December 1922.

	1921 tons	Jan.-June 1922 tons
Pig iron	649,686	341,429
Coke	596,458	261,184
Charcoal	9,785	3,117
Reworked	28,125	10,576
Other	15,318	66,552
Ferroalloys	7,575	4,633
Ferromanganese	4,515	2,309
Spiegeleisen	453	678
Ferrochrome	1,537	380
Ferrotungsten	25	23
Other	1,045	1,243
Raw steel	832,428	430,476
Open-hearth	759,790	373,514
Bessemer	64,847	54,745
Electric-furnace	5,195	1,933
Crucible	2,427	259
Other	169	25
Rolled steel	479,587	283,217
Rods	125,969	.....
Bars	135,488	74,295
Shapes	113,316	54,625
Plates	.....	79,745
Tubes	18,512	10,011
Wire	26,443	.....
Rails	49,859	.....
Others	9,999	64,541
Steel forgings and castings	82,242	43,313
Forgings	37,508	13,769
Castings	32,167	19,746
Special products	12,567	326
All other.....	.....	9,472

Iron and Steel Imports Gain

Total of 106,050 Gross Tons Received in March Exceeds Preceding Month's Imports by 38,368—Pig Iron Registers a Large Increase, Gaining 36,551 Tons—Tonnage of Iron Ore Received Is Larger

FIGURES just issued by the United States department of commerce, bureau of foreign and domestic commerce, show that in March imports of iron and steel totaled 106,050 gross tons. This is an increase of 38,368 tons as compared with imports of 67,682 tons in February. It also is a gain of 91,900 gross tons as compared with imports in the corresponding period of 1922 which totaled but 14,150 tons.

IMPORTS OF VARIOUS ORES AND FERROALLOYS

Gross Tons

	March		Three months ending March	
	1923	1922	1923	1922
Ferromanganese	8,082	3,819	20,041	6,160
Ferrosilicon	949	343	3,346	2,214
Manganese ore	12,799	15,120	18,264	31,824

The tonnage of iron and steel imported during March brings the total imports of this material for the three months ending with March to 293,688 gross tons. This is an enormous increase as compared with 39,290 gross tons in the same period of 1922, the gain being 254,398 tons. Imports of pig iron during the three months have been the heaviest totaling 192 072 tons.

Compared with February figures importation of pig iron during March registered a large increase. Imports of this material during the month totaled 72,344, a gain of 36,551 gross tons compared with the preceding month.

Gains also were made by ferromanganese with 8082 tons compared with 7741 in February; scrap with 20,047 compared with 13,686; bar iron with 119 against 85; structural shapes with 532 tons against 468; tubular products with 583 as compared with 215; round iron and steel with 515 as against 329; and nails and screws with 132 as compared with 31.

Losses were recorded for ferrosilicon with 949 gross tons as against 1494 tons in February; rails with 838 as compared with 1828; boiler and other plates with 3 against 6; sheets and saw plates with 63 as compared with 211; tin plate with 452 against 2889; wire rods with 133 as compared with 547; castings and forgings with 73 against 177; bolts, nuts, rivets, etc., with 19 as against 21; and flat wire and strip steel with 44 as compared with 104 gross tons in February.

IRON AND STEEL IMPORTS

Gross tons

	—March—		Three months ending March	
	1923	1922	1923	1922
Pig iron	72,344	1,871	192,072	10,105
Ferromanganese	8,082	3,819	20,041	6,160
Ferrosilicon	949	343	3,346	2,214
Scrap	20,047	2,844	55,684	7,509
Bar iron	119	322	874	880
Steel ingots, bars, etc.	1,149	1,851	5,248	5,818
Structural shapes	532	177	1,233	556
Rails	838	1,387	4,415	3,661
Boiler and other plates	3	....	359	....
Sheets and saw plates	63	16	361	99
Tin plate	425	1,223	5,443	1,789
Wire rods	133	297	1,426	499
Total	104,684	14,150	290,502	39,290
OTHER IMPORTS				
Tubular products	583	*	1,153	*
Round iron and steel	515	*	1,140	*
Castings and forgings	73	*	366	*
Nails and screws	132	*	261	*
Bolts, nuts, rivets, etc.	19	*	54	*
Flat wire and strip steel	44	*	212	*
Grand total	106,050		293,688	

*Due to changes in classification comparisons are not possible.

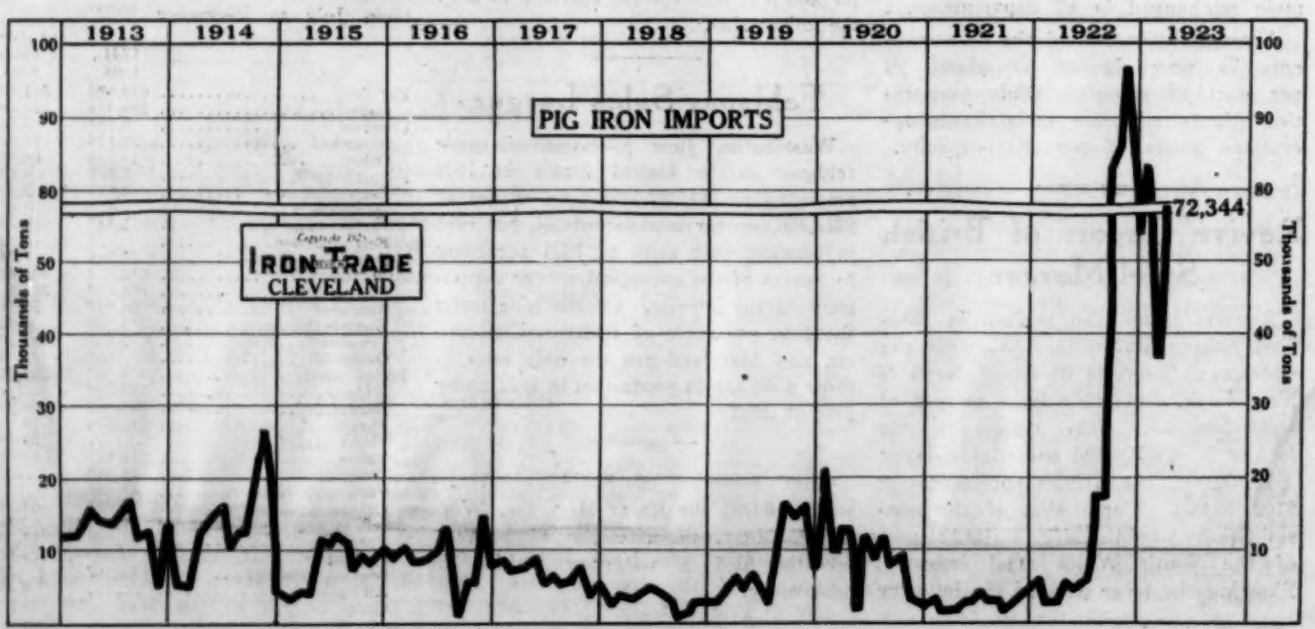
During March 166,626 gross tons of iron ore was imported. This is a gain of 62,924 tons as compared with 103,702 tons imported in February and is an increase of 154,613 tons compared with imports of 12,013 tons in the corresponding period of 1922. In the three months ending with March 515,860 tons of iron ore has been imported. This compares with 41,463 gross tons in the corresponding period of 1922.

IRON ORE IMPORTS

Gross Tons

From:	—March—		Three months ending March	
	1923	1922	1923	1922
Spain	21,471	1,000	41,049	10,157
Sweden	41,535	....	121,099	7,458
Canada	31	413	155	512
Cuba	52,000	10,600	173,339	21,050
Other countries	51,589	....	180,218	2,286
Total	166,626	12,013	515,860	41,463

Imports of manganese ore registered an increase in March. The government figures for the month show that 12,799 gross tons of this ore was brought into the country which compares with 4636 tons in February and 15,120 tons in March, 1922. So far this year 18,264 gross tons of manganese ore have been imported which compares with 31,824 tons in the corresponding period of last year.



Here and There in Industry

Live Information Which Records the Expansion of Various Lines of Productive Enterprise

YOUNGSTOWN FOUNDRY & MACHINE Co., Youngstown, O., acquired by purchase the Poland avenue plant of the Mahoning Foundry Co. and has started operation of the plant. Acquisition of this plant gives the company three plants in Youngstown. Two are devoted to general iron foundry and machine work while one is used for the making of cold and sand rolls. The company recently bought 12 acres near Girard, O., where it will erect a modern plant devoted exclusively to the making of rolls.

* * *

AN EXCLUSIVE license to manufacture and sell the water-cooled ports, reversing valves and removable slag pockets of the Blair Engineering Co., has been given to the Blaw-Knox Co., 602 Farmers' Bank building, Pittsburgh.

* * *

ENTIRE assets and liabilities of the American Radiator Co. of Canada, Ltd., and the Dominion Radiator Co., Ltd., have been taken over by the Dominion Radiator & Boiler Co., Ltd., recently formed with offices at Toronto, Ont. Plants are being operated at Toronto and Brantford, Ont. H. N. Leadbetter is president of the company.

* * *

OPERATION will be started immediately at the plant of the Electric Furnace Co., Salem, O., which was recently purchased by F. A. Hollis and R. F. Benzinger of Alliance and F. T. Cope, Salem. It has been announced that improvements will be made and new machinery installed. The plant has been idle since last March.

* * *

THE Mamolith Carbon Paint Co., manufacturer of paints for railroads, electric railway, bridge, marine and structural work has been sold to J. H. Kresge, president of the Kresge Coal & Mining Co., of Pittston, Pa. The sale which involves approximately $300,000 includes the plant, equipment, paint formulas and carbon mines of the company in Arkansas. Interested in the purchase with Mr. Kresge are Lyman H. Dresbach, Cincinnati and R. Lee Clements, Philadelphia. The company is operating under a Missouri charter which will be surrendered for an Ohio charter and the capitalization increased from $200,000 to $500,000. Mr. Kresge will be president of the company, Mr. Dresbach, treasurer and Mr. Clements, vice president and general manager. The company was organized in 1900 by A. B. Burtis, who died last January.

* * *

PLANS for the erection of new buildings have been announced by the A. C. Williams Co., Ravenna, O. Work on the new buildings which will give sufficient added facilities to increase production 50 per cent, will be started about the middle of the summer and it is expected to have the buildings completed by early fall. The plans include a molding room, erection of a second cupola, a new cleaning room, sand storage room and additional tracks to handle the raw materials.

* * *

THE former plant of the Worcester Machine Screw Co., a subsidary of the Standard Screw Co, at 79 Beacon Street, Worcester, Mass., which has been idle for two or three years, has been purchased by the Worcester Spinning Corp., a recently organized $2,500,000 corp., which will utilize it for the making of a substitute for cotton from Chinese grass and bark.

* * *

THE Superior Screw & Bolt Mfg. Co., East 93rd street and Aetna road, Cleveland, has elected these officers as follows: President, Dan P. Swanders, who is also vice president and general manager of Perfection Spring Co.; vice president in charge of manufacturing, M. J. Riley; vice president in charge of sales, N. T. Jones, formerly president; secretary and treasurer, W. J. Hayes.

* * *

METAL specialties, punch press work and the manufacture of dies and small tools, will be specialized in by the St. Louis Stamping & Tool Co., 123 Pine street, St. Louis, which recently was incorporated with a capital stock of $15,000. The company is established in a fully equipped shop but will add additional punch press equipment from time to time. Officers of the company are: President, David Ostrander; vice president, Emry Torman and secretary-treasurer, George C. Hargrave.

* * *

THE Stoughton Wagon Co., Stoughton, Wis., has changed its name to Lenerman System, Inc. It was organized several months ago to manufacture metal filing cabinets, indices, etc., and is about to start work in a part of the factory of the Oneida Motor Truck Co. at Green Bay. J. T. Lederman, inventor of the appliances, is production manager. He has been supervising the manufacture of tools and dies at Chicago and these are now being transferred to Green Bay.

* * *

TO SELL and install power plant equipment is the purpose of the Ashmead-Danks Co., 7016 Euclid avenue, Cleveland, which recently was incorporated under the laws of Ohio. At the present time the company represents the Tracey Engineering Co., manufacturer of steam purifiers; the Bacharach Industrial Instrument Co., maker of precision instruments; the C. Lee Cook Mfg. Co., metallic packings; and the E. A. Wilcox Mfg. Co., manufacturer of gaskets. Officers of the company are: President, A. C. Danks; vice president, C. B. Ashmead and secretary, Winfield Worline.

* * *

WITH a capital stock of $100,000 capital stock the Steelcraft Parts Co., Cleveland, recently was incorporated to manufacture structural steel tools, including rivet sets, chisel blanks, pistons for riveting and chipping hammers, chisel bushings, punches and punch dies, hardened and ground bolts. The company will take over the plant of the Structural Tool Co., 3160 West 106th street, Cleveland. Officers are: President, Charles L. Wasmer; vice president, Carl E. Kramer and secretary, John C. Wasmer. These men also are the executive officers of the Cleveland Wrought Products Co., 3590 West Fifty-eighth street, Cleveland.

* * *

ERECTION of an addition to its plant at Cincinnati has been completed by the Warner Elevator Mfg. Co., which gives the company a main shop length of 500 feet, 200 feet in

width. The building is two stories high and has a basement. This addition makes the plant one of the largest of its kind in the world devoted exclusively to the manufacture of electric passenger and freight elevators. A traveling crane in the south wing connects the railroad spur with the main bay and eliminates most of the trucking to and from the freight cars.

* * *

THE property and business of the Rivett Lathe & Grinder Co., Boston, was sold at auction recently, the purchaser being the creditors' protective committee. A new company known as the Rivett Lathe & Grinder Corp. has been formed under the laws of Massachusetts and has taken over the entire business. Sufficient cash capital is provided by the reorganization to permit operations on a more extensive scale. No changes have been made in the factory personnel which will continue to be under the direction of Thorvald S. Ross as president and general manager.

* * *

THE Columbia Steel & Shafting Co., Pittsburgh, has purchased the entire stock of shafting and machinery for manufacturing same of the Brightman Mfg. Co., Columbus, O. In the future the Brightman company will devote its entire attention to the manufacture of nuts and shafting machinery. The company's nut production already has been increased. The company also will retain its complete equipment for finishing hexagon bars from the rough stock. In its machinery department more time and space will be given to the development of the equipment for finishing bar stock and tubing, including turning machines, straighteners, drawn benches, pointers and cut-off machines.

* * *

ERECTION of a steel building of approximately 5000 square feet of floor space is planned by the T. L. Talbert Iron & Steel Co., Inc., Charlotte, N. C. The company will fabricate small lots of structural steel, build stairways and other ornamental work, and will carry from 50 to 100 tons of steel in stock. It is putting in machinery in the way of punches and shears which will enable it to handle up to 15-inch beams. In addition to this work, the company acts as sales agent for a number of manufacturers in special lines. Officers of the company are: President and general manager, T. L. Talbert; vice president and sales manger, W. M. Hood and treasurer, E. C. Boyette.

British Iron and Steel Exports Increase

Birmingham, Eng., May 24.—The British board of trade's return for April shows a total export of iron and steel products including scrap amounting to 398,507 tons as compared with 380,136 tons in March and 247,422 tons in April, 1922. Imports, including scrap, for April totaled 133,929 tons compared to 120,908 tons in March and 72,074 tons in April, 1922. Details follow:

EXPORTS, TONS

	April 1922	April 1923
Scrap	16,009	11,550
Pig iron:		
Forge and foundry	15,492	59,982
Acid	21,548	35,525
Basic	.....	.....
Ferroalloys	5,940	16,648
Steel ingots	33	61
Blooms, billets, slabs	796	1,862
Bars, rods, angles, shapes, etc.	17,235	29,375
Castings, iron	24	262
Castings, steel	40	24
Forgings, iron	3	.....
Steel girders, beams, etc.	4,152	5,622
Hoops and strips	1,681	5,598
Plates and sheets, not galvanized:		
Armor plates	812	.....
Plates and sheets not under ⅛-inch thick	8,036	13,802
Plates and black sheets under ⅛-inch thick	13,668	20,100
Black plates	5,707	4,391
Plates and sheets, coated:		
Galvanized sheets	40,454	50,361
Tin plate	36,055	41,015
Cast tubes, pipes and fittings	3,940	4,216
Wrought tubes, pipes and fittings	5,157	9,432
Rails for trams	130	1,025
Railway rails	28,398	35,609
Sleepers and fishplates	16,250	8,991
Tires and axles	835	1,468
Wheels and axles	3,392	3,334
Railway material, other types	5,831	3,484
Wire	3,226	6,552
Wire manufactures	2,353	3,874
Nails and tacks	917	1,547
Wood screws	231	374
Bolts and nuts	1,071	1,959
Manufactures of cast iron	920	1,453
Anchors, cables and chains	860	1,065
Bedsteads and finished parts	590	640
Hollow ware	690	1,288
Other manufactures of iron and steel	11,320	13,850
Total, including scrap	274,422	398,507

IMPORTS, TONS

	April 1922	April 1923
Pig iron:		
Forge and foundry	2,075	2,266
Acid	.....	.....
Basic	5,344	2,026
Ferroalloys	738	2,100
Steel ingots	54	993
Blooms, billets, slabs:		
Iron	102	1,617
Steel	9,818	42,019
Bars, rods, angles, shapes, etc.:		
Iron	5,667	13,770
Steel	5,579	13,863
Steel:		
Wire rods	2,754	2,834
Other steel	2,438	6,696
Special steels	33	29
Castings, iron	141	63
Castings, steel	286	357
Forgings, iron	91	4
Forgings, steel	61	63
Steel girders, beams, etc.	2,295	4,639
Hoops and strips	2,037	1,782
Plates and sheets	1,697	5,503
Cast tubes, pipes and fittings	1,761	1,100
Wrought tubes, pipes and fittings	1,992	1,359
Rails for trams	1,044	.....
Railway rails	866	1,019
Tires and axles	85	375
Railway material, other types	327	421
Wire	3,839	2,701
Wire manufactures:		
Other sorts	438	421
Wire nails, including staples	3,650	5,059
Nails and tacks	411	313
Bolts and nuts	622	410
Hollow ware	1,330	524
Other manufactures of iron and steel	2,237	1,057
Total, including scrap	72,074	133,929

British Output Continues at High Rate

London, May 24.—Production of pig iron in Great Britain in April, according to the official figures of the National Federation Iron & Steel Manufacturers, was 652,200 gross tons compared with 633,000 tons in March. This is the highest monthly total attained since January, 1921, when it was 642,100 tons. There were 216 furnaces in blast at the end of April, compared with 202 at the end of March, 189 at the end of February, 183 on Jan. 31, 169 at the end of 1922 and 77 at the end of 1921. Pig iron production in April included 226,400 tons of hematite, 207,200 tons of basic, 144,700 tons of foundry, and 38,800 tons of forge grades.

Production of steel ingots and castings in April was 749,400 tons compared with 802,500 tons in March. With the exception of the March production this is the highest output since September, 1920.

Details of the pig iron and steel output in gross tons from January, 1921, to April, 1923, follow:

Pig Iron

	1923	1922	1921
Jan.	567,900	288,000	642,100
Feb.	543,400	300,100	463,600
March	633,600	389,800	386,000
April	652,200	394,300	60,300
May	.....	407,900	13,600
June	.....	369,200	800
July	.....	399,100	10,200
Aug.	.....	411,700	94,200
Sept.	.....	430,300	158,300
Oct.	.....	481,500	235,500
Nov.	.....	493,900	271,800
Dec.	.....	533,700	275,000
		4,899,500	2,611,400

Steel Ingots and Castings

Jan.	624,300	327,500	492,400
Feb.	707,100	418,800	483,500
March	802,500	549,400	359,100
April	749,400	404,200	70,600
May	.....	462,300	5,700
June	.....	400,200	2,700
July	.....	473,100	117,200
Aug.	.....	528,400	434,100
Sept.	.....	555,900	429,300
Oct.	.....	565,200	405,400
Nov.	.....	600,800	443,800
Dec.	.....	546,100	381,000
		5,831,900	3,625,800

Operate Without Accident

Worcester, Mass., June 5.—All the Worcester works of the American Steel & Wire Co., the Wickwire Spencer Steel Corp., and the machine division of the Norton Co., the Worcester Stamped Metal Co., Walden-Worcester, Inc., Hobbs Mfg. Co., and the M. S. Wright Co., operated through April without a lost-time accident to an employe, according to the honor roll of the Worcester County Safety council.

Men of Industry

Personal News of a Business Character Pertaining to the Iron and Steel and Related Fields

H. H. PLEASANCE, who recently was elected vice president of the United Alloy Steel Corp., Canton, O., as noted in a recent issue of IRON TRADE REVIEW, began his sales career with the Standard Oil Co. of Cleveland. In 1903, being interested in steel products, he entered the employ of the Cambria Steel Co. at its Cleveland

H. H. PLEASANCE

office, and was associated with E. D. Rogers, who later went to Canton as general manager of sales for the United Steel Co. After a short time in the Cleveland office of the Cambria company, Mr. Pleasance was transferred to the Detroit district, where he remained until 1913 when he moved back to Cleveland in charge of sales for the United Steel Co. In January, 1917 he went to Canton, O. as assistant general manager of sales for the United Alloy Steel Corp. and in May, 1917 was made general manager of sales.

Harry C. Thomas, assistant general manager of the United company, and who also recently was elected a vice president of the organization, came to the company five years ago as general superintendent of the plant. Mr. Thomas' experience covers 23 years of activity in the steel business, covering practically every phase of the industry. He started in 1900 as a chemist for the Wheeling Steel & Iron Co. and subsequently was connected in a chemical, metallurgical and operating capacity with the Alan Wood Iron & Steel Co., Philadelphia, with the United States Steel Corp.'s plants at Braddock, Pa., Duquesene, Pa., Donora, Pa., Clairton, Pa., and Gary, Ind. Prior to joining the United Alloy Steel Corp. he was for 10 years assistant general superintendent of the United States Steel Corp.'s Gary, Ind. plant.

Leon Robbins of the Leon Robbins Corp., New York, sailed May 29 on the Mauretania for a three-month's visit to Europe. He will spend most of his time in Turkey and Egypt.

J. F. Newman, for the past 11 years purchasing agent for the Weirton Steel Co., Weirton, W. Va., has resigned that position to engage in business for himself at Pittsburgh.

L. M. Dalton has succeeded E. J. Burnell as manager of the Boston branch office of the Link-Belt Co., Chicago. Mr. Burnell has resigned his connection with the company to engage in business for himself.

Angus MacArthur, formerly superintendent of the coke plant of the Chicago By-Product Coke Co., Chicago, has been appointed district engineer for the Koppers Co., Pittsburgh, at its Chicago office, 1709 Peoples Gas building, which recently was opened.

Earl W. Cannell, who has been connected with Osborn Mfg. Co., Cleveland, for the past 17 years, has been appointed purchasing agent for the company effective June 1. Prior to this appointment Mr. Cannell has had charge of the sales development department and previous to that was a salesman. W. E. Mitchell, who has been purchasing agent of the company, has resigned to engage in business for himself.

Norman F. Brown, vice president of the Dravo Contracting Co., Pittsburgh, has resigned his position as of June 1. He is opening an office in Pittsburgh to engage in private practice as a consulting engineer dealing with railroad and transportation problems and municipal work. He has had extended experience in his line as assistant to the chief engineer of the Pennsylvania railroad, as director of the department of public works of Pittsburgh, and his active connection

HARRY C. THOMAS

with the Dravo company will fit him for his new work.

George E. Benson, treasurer of the National Tube Co., Pittsburgh, has been elected vice president of the Union Trust Co., that city, in charge of new business and credits. Mr. Benson is a member of the Pittsburgh Association of Credit Men, and was first chairman of the United States Steel Corp. credit men, serving two years. In adidtion to being treasurer of the National Tube Co., he is treasurer of the Shelby Steel Tube Co.; treasurer and director of the Gary Tube Co., the McKeesport Connecting Railroad Co., the Benwood & Wheeling Connecting Railroad Co., the Lake Terminal Railroad Co., the Shelby Land Co., and the Connoquenessing Bridge Co.

C. P. Coffiin, credit manager of the Illinois Steel Co. since 1902, retired

from service June 1. Prior to 1902 Mr. Coffin was associated with interests which became part of the subsidary companies of the United States Steel Corp. In 1887 he was secretary and assistant treasurer of the Minnesota Iron Co. and retained that position until June 7, 1901, when it was taken over by the Oliver Iron Mining Co. For several years Mr. Coffin was president of the Chandler Iron Co. and treasurer of the Duluth & Iron Range railroad. He was also president of the Lake Superior Consolidated Iron Mines. N. E. Crull, who for a number of years has been Mr. Coffin's assistant, will succeed him as credit manager of the Illinois Steel Co.

R. M. Sisk, vice president and assistant treasurer of the Sharpsville Boiler Works Co., Sharpsville, Pa., has resigned.

George Roberts, proprietor of the Thistle Wire Works, Lee, Mass., will sail June 9 for his annual visit to Scotland, which will make his thirty-sixth passage over the Atlantic.

Philip Carr former sales engineer of the Davenport Machine Tool Co., Rochester, N. Y., now occupies a similar position with the Greaves-Klusman Tool Co., Cincinnati.

William M. Myers, general manager of the Highland Iron & Steel Co., was elected president of the Terre Haute, Ind., chamber of commerce recently.

Hugh Edward Poynter, president of the Baldwin Canadian Steel Corp., Toronto, Ont., has become a baronet, succeeding to the title owing to the death of his brother, Sir Ambrose M. Poynter, of London.

H. F. Bardwell, formerly district sales manager of the Vanadium-Alloy Steel Co., 143 Liberty street, New York, has been appointed assistant sales manager of the Cyclops Steel Co., 120 Broadway, New York.

John Stambaugh and John Tod have been elected to the board of directors of the Youngstown Sheet & Tube Co., Youngstown, O., succeeding Henry Heedy and Porter O. Pollock, resigned. Mr. Tod represents large Brier Hill interests in the company.

J. Leonard Replogle, chairman of the Replogle Steel Co., Wharton, N. J., and president of the Vanadium Corp. of America, Detroit, recently was elected a director of the Brightman Mfg. Co., Columbus, O. Charles N. Replogle, his brother, is president of the Brightman company, while J. P. Dods is vice president, R. C. Johnson, secretary and Paul A. DeLong, treasurer.

Henry K. Swinscoe, former superintendent of the Morgan Works, Worcester, Mass., of the Wickwire Spencer Steel Corp., has been made assistant superintendent of the Clinton, Mass., works of the same company, of which his father, the late Charles Swinscoe, was agent of its predecessor, the Clinton Wire Cloth Co.

W. D. Birbeck, for the past 30 years identified with companies engaged in the manufacture of gas tanks has accepted the position of assistant sales manager of the Stacey Mfg. Co., Cincinnati. He succeeds Charles Galinari, who resigned recently.

John H. Merrill, vice president of the Manhattan Rubber Mfg. Co., Chicago, and Herbert H. Reynolds, president of the People's National bank, Jackson, Mich., have been elected to the board of directors of the Reynolds Spring Co., Jackson, Mich. They fill recent vacancies in the board.

H. R. N. Johnson, who formerly represented the Uehling Instrument Co., Paterson, N. J., in Minnesota and the Dakotas, has joined the staff of the W. P. Nevins Co., 120 South Ninth street, Minneapolis, which now represents the Uehling company in that territory.

Dr. Samuel C. Lind, superintendent of the rare and precious metals experiment station of the federal bureau of mines at Reno, Nev., on June 1, became chief chemist of the bureau at Washington. He succeeded Dr. Richard B. Moore, who resigned to enter a New York firm of consulting chemists and metallurgists.

Algernon L. Curtis, consulting expert in foundry sands and refractories, Chatteris, England, has been awarded a grant of £150 ($700) by the British Iron and Steel institute from the Andrew Carnegie research scholarship fund to carry out a research on steel molding sands under high temperatures. Mr. Curtis was educated at Lincoln technical school, England, and the University of Pennsylvania.

Frank O. Hoagland, for several years general manager of the Reed-Prentice Co., Worcester, Mass., has resigned to accept a position in the mechanical department of the Saco-Lowell Shops, Boston, and his duties will be taken over by J. Verner Critchley, who recently was elected president of the company. William T. Cowell, former assistant works manager of the Lodge & Shipley Machine Tool Co., Cincinnati, has been appointed works manager of the Reed-Prentice company and Frederick W. McIntyre, general sales manager of the latter organization, has been made assistant to the president.

Harry A. Curtis, in charge of the United States department of commerce investigation of nitrates, has been appointed professor of chemical engineering at Yale university. He will undertake his new work in the fall. Dr. Curtis graduated from the University of Colorado in chemical engineering and for several years prior to 1917 taught at that institution. He received his Ph.D. degree in chemistry at the University of Wisconsin and later taught chemistry at Northwestern university. Recently he has been chief chemist of the International Coal Products Co. and served as general manager of the Clinchfield Carbocoal Corp., South Clinchfield, Va.

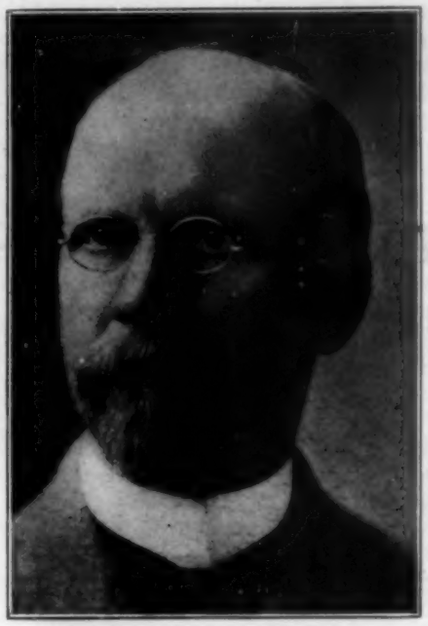
A. C. Danks, who has been named president of the recently formed Ashmead-Danks Co., Cleveland, prior to his connection with this organization was in the service of the United States Steel Corp. as superintendent of steam and water at the Edgar Thomson works of the Carnegie Steel Co., Braddock, Pa. C. B. Ashmead, who is vice president and treasurer of the company, for the past 10 years has represented the Richardson-Phenix Co., Milwaukee, as district manager at Pittsburgh. Both Mr. Danks and Mr. Ashmead are members of the American Society of Mechanical Engineers, the National Electric Light association, Association of Iron and Steel Electrical Engineers, the Cleveland Engineering society and the Engineers' Society of Western Pennsylvania.

T. E. Simpers, formerly manager of the general mill section of the industrial department of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been appointed export representative of the industrial department of the company. He has been succeeded for the present by J. R. Olnhausen, manager of the textile section of the industrial department. C. H. Long, formerly manager of the contract section of the railway department of the company has been appointed section manager of the light traction division of that department, while R. W. Soady has been appointed to succeed Mr. Long. W. P. Lend has been appointed manager of the merchandising division of the Detroit office of the company succeeding F. D. Koelbel who will take up general duties in connection with both the central station division and the merchandising division.

Obituaries

CHARLES PETTIGREW, who died May 22 at Pasadena, Cal., as noted briefly in the May 31 issue of IRON TRADE REVIEW, for many years was general superintendent of the Joliet works of the Illinois Steel Co., and later of the Maryland Steel Co. mills at Sparrows Point, Md. He was 79 years of age. Mr. Pettigrew was born in Scotland. At the age of 11 he began working in a machine shop and later served an apprenticeship at the Scotland Street, Iron Works, Glasgow. He came to the United States in 1867, entering the employ of Carlyle Mason in Chicago. In 1870 Mr. Mason sent him to the Union Coal Transportation Co. at Joliet, to execute an important mechanical job. Three years later, he had risen to the post of master mechanic, the plant having been rebuilt and renamed the Joliet Iron & Steel Works. In 1889 this plant was consolidated with the Union Steel Co. and the North Chicago Rolling Mill, both of Chicago, becoming the Joliet works of the Illinois Steel Co. Shortly thereafter, Mr. Pettigrew was made general superintendent, and later general manager, a position he held until 1896. During his work at Joliet, Mr. Pettigrew's executive ability and mechanical genius is credited with being a large factor in the growth of this plant to the largest iron and steel works in the west. Among his achievements are the following: First to adopt the corliss valve motion to a blowing engine, using corliss valve motion in the steam cylinders and metal valves in the blowing cylinders; first to use tubular boilers in blast furnace work; first to roll rails from the initial heat, without an intermediate re-heating, effecting a saving in labor, time and fuel; first to roll rails in multiple lengths, instead of singly; first to devise a drag conveyor for taking scrap from the bloom shears; first to perfect a system for rolling 4x4-inch billets on a 3-high mill with automatic machinery. Duplex hydraulic shears were devised by Mr. Pettigrew at this time for cutting up the product of this mill; as well as a roller conveyor for taking the billets away from the shears; collaborated with William Garrett in perfecting the Garrett rod mill. In March 1896 Mr. Pettigrew resigned from the Illinois Steel Co. and went to Indianapolis to build a mill for the American Steel Co. While there, he was invited to assume the management of the Maryland Steel Co.'s works at Sparrows Point. In seven years Mr. Pettigrew practically rebuilt the Sparrows Point plant, tripling its output, and putting it on a paying basis. In May 1904 he resigned.

Oscar Richey, who retired a few years ago as president of the Kelly Nail & Iron Co., Ironton, O., died May 29 at his home in that city, aged 76 years. He had been in



CHARLES PETTIGREW

ill-health for some time and early this spring went to Florida to recuperate, but returned in April, the expected benefit not appearing. The funeral was held at Ironton, Thursday, May 31.

From an humble beginning, Mr. Richey easily became one of the outstanding figures in Ohio valley iron and steel manufacturing history. When the Kelley Nail & Iron Co. was incorporated Nov. 11, 1882, Mr. Richey entered the office of the company as a clerk. About 1885-86, he was chosen secretary and treasurer of the company, continuing thus for a number of years or until the death of Mr. Kelly, early in the 90's the vice president being Ironton A. Kelly, and the new president Charles Parrott. About 1900 Mr. Richey was elected president and general manager of the Kelly company, retaining the office until his retirement, to which had been added the offices of general manager of sales, and purchasing agent.

John J. Gross, a supervisor in the plant of the Doehler Die Casting Co., Brooklyn, died June 2, at his home in Brooklyn.

Charles J. Ellsworth, sales manager of the E. W. Bliss Co., Brooklyn, New York, died of heart disease, May 26. Mr. Ellsworth was 43 years of age.

Leonard F. W. Hillner, aged 51, vice president and director of the Pittsburgh Bridge & Iron Works, Bessemer building, Pittsburgh, died June 2 at his home in that city, after a week's illness. He was born in Detroit and received his higher education at the University of Michigan. He located in Pittsburgh 25 years ago and had been affiliated with the Pittsburgh Bridge & Iron Works as chief engineer, since its formation. He was a director of the Engineers' Society of Western Pennsylvania, a member of the chamber of commerce and of the University club and other civic organizations.

Henry E. Dean, Worcester, Mass., retired manufacturer of wire goods, died at a hospital in that city, May 24, following an operation. He was 60 years old. The business, which was established by his father, many years ago, was sold to the Parker Wire Goods Co., Worcester, about 10 years ago. Mr. Dean had been a member of the Massachusetts legislature and was prominent in Worcester civic affairs.

Henry Southworth Shaw, aged 90 years, president of the Saco-Lowell Shops, Boston, and former president of the Eastern Machinery Co., and the Rhode Island Malleable Iron Works, Hills Grove, R. I., died at his home in Milton, Mass., June 1. He was for a short time president of the Boston & Maine railroad and had also been identified with many other business interests.

Willard T. Sears, research and experimental engineer of the Niles-Bement-Pond Co., New York, died recently at Montclair, N. J. Mr. Sears had been with the company for over 20 years. Prior to this he was connected with the Pennsylvania Steel Co. for a number of years. He was a member of the class of 1887 of Massachusetts Institute of Technology. M. Sears was an inventor, the machine tool industry having greatly benefited from the many developments which he originated.

Texas Company Formed To Build Steel Plant

Forth Worth, Texas, June 4.—John H. Kirby, of Houston, oil operator and lumber manufacturer, who purchased the ironworks of George W. Armstrong, Inc., at Forth Worth a few months ago, has organized the Texas Steel Co. with a capital stock of $2,500,000. The new company will use the present iron mill as a nucleus for a steel plant with a capacity of 5000 tons of rolled steel a month. The plant is expected to start operation about Aug. 1 when the first electric steel furnace unit will be ready according to J. P. Foster, general manager. The present plant consists of a muck mill, roughing mill and four finishing mills.

The remodeled plant will produce steel bars for commercial use, structural shapes, steel castings, reinforcing steel, rods, and eventually steel pipe and casing.

The oil well supply department, which has been in continuous operation, and which employs 100 men, will be enlarged.

Rolls Electrolytic Iron

The Milford Electrolytic Iron Co., Milford, Conn., which is operating under the Eustis-Perin patents, successfully is producing electrolytic iron. The product of the company is being cold rolled into sheets by the George I. Stanford Steel Products Co., Milford, and these sheets are giving satisfactory results in deep stamping work. The officers of the company are: President, Dr. Charles F. Lindsay; vice president, George I. Stamford; treasurer, D. G. Ogilvie. Charles Page Perin of C. P. Perin & S. M. Marshall, New York, is interested in the company.

Molders' Wages Raised in Six Centers

Changes in the wage rates of union molders recently have brought the composite rate for 11 cities up from 79 cents to 84 cents an hour, as of June 1. The advances noted by the National Founders' association are as follows: Minneapolis, from $6 to $6.16; Indianapolis, from $6 to $7; St. Louis from $6.50 to $7; Boston from $6 to $7.20; Cleveland from $6 to $7.20, and Chicago from $6.80 to $7. No reductions are reported. Rates in other cities, of the group of 11 making up the composite figure, remain as follows: Pittsburgh $7.50; Detroit $6; New Orleans $6; Cincinnati $6; New York $6.75. These rates are for eight hours in all cases. The composite rate for eight hours now is $6.72, compared with $6.32 two months ago.

Iron Ore Output Increased 61 Per Cent

IRON ore mined in the United States in 1922, exclusive of that which contained more than 5.5 per cent of manganese, amounteu to 47,128,527 gross tons, according to revised and official figures issued by the geological survey. The tonnage produced in 1921 was 29,282,690, the output in 1922 representing an increase of 61 per cent. The states of Minnesota, Michigan and Wisconsin accounted for 39,799,562 of the tonnage mined in 1922, the increase for the three states combined being 58 per cent over the output in 1921. The Chattanooga and Birmingham districts made gains of 126 and 73 per cent, respectively. The Adirondack district was the only one that mined less ore than in 1921. The following table gives the output by states, in gross tons:

	1921	1922
Alabama	2,876,141	5,234,568
California	2,064	3,204
Colorado	3,823	513
Georgia	5,556	24,149
Idaho	799	200
Massachusetts	4,100	.....
Michigan	7,075,204	10,453,578
Minnesota	17,811,325	28,768,960
Missouri	36,550	58,408
Montana	26,174	21,726
Nevada	268	51
New Jersey	58,589	90,359
New Mexico	110,528	118,038
New York	469,988	444,381
North Carolina	2,583	17,279
Pennsylvania	146,649	780,836
Tennessee	25,709	156,464
Texas	131	.....
Utah	60,773	15,018
Virginia	74,021	30,971
Wisconsin	257,014	577,024
Wyoming	234,701	332,800
Totals	29,282,690	47,128,527

The average value per ton of iron ore at the mines in 1922 is stated by the geological survey as $3.12, or 25 cents less than the average in 1921. The stocks of iron ore at the mines in 1922 amounted to 10,524,279 tons, a decrease of 24 per cent from those in 1921.

Ore shipments from mines in the United States in 1922, excluding that containing more than 5.5 per cent manganese, totaled 50,612,620 tons valued at $157,809,286, an increase of 90 per cent in quantity and a gain of 76 per cent in value.

On the subject of pig iron, the survey's official report states the general average value for all grades of iron at the furnaces in 1922 was $21.98 a ton, a decrease of $2.30 from the value in 1921. Shipments from blast furnaces in 1921 and 1922, by states, in gross tons, are given as follows.

	1921	1922
Alabama	1,241,227	2,223,159
Illinois	1,490,638	2,729,172
Indiana	1,655,275	2,191,356
Kentucky	28,375	140,217
Michigan	200,944	595,647
Missouri	17,028	*
New York	786,713	1,708,605
Ohio	3,649,835	6,756,648
Pennsylvania	6,072,196	9,732,024
Tennessee	21,972	95,326
Virginia	66,916	31,022
West Virginia	259,312	309,944
Wisconsin	93,666	209,289
Other states	454,522	948,329
Totals	16,038,619	27,670,738

*Included under "Other states."

An increase of 70 per cent in the shipments of ferroalloys is shown for 1922. The shipments of ferrosilicon showed an increase of 181 per cent and those of ferromanganese an increase of 45 per cent. The shipments of spiegeleisen only slightly exceeded those in 1921. The average value of ferromanganese at the furnaces in 1922 was $65.04 a ton, and of spiegeleisen $30.79 a ton. A comparison of shipments, in gross tons, follows:

	1921	1922
Ferromanganese	111,374	161,612
Spiegeleisen	69,230	70,253
Ferrosilicon (7 per cent or more silicon)	55,099	154,866
Ferromolybdenum	19	108
Ferrotungsten	195	610
Other varieties	12,710	35,831
Totals	248,627	423,280

The tonnages for ferromanganese includes a small quantity of silicomanganese, for 1921 and 1922, and the shipment of spiegeleisen in 1921 includes a small lot of silicospiegel.

Describes Kansas Court

Owing to popular interest in the nature and operations of the industrial court law of Kansas, an account of the law and its workings since it has been in effect has been published by the United States bureau of labor statistics as bulletin No. 322. The report gives the text of the law, which was passed in 1920, a synopsis of the cases filed on the industrial side of the court during 1920 and 1921 showing the methods and principles adopted by the court in its various actions, and an account of the legal proceedings arising in connection with the attendance of witnesses before the court, and other activities of the court. A resume is given of the annual reports which have been published, and a bibliography of books and articles relating to the court is appended.

Testify at Hearing of Steel Corporation

New York, June 5.—W. W. Lukens, vice president of the Alan Wood Iron & Steel Co., and H. H. Barbour, formerly vice president and sales manager of the Lackawanna Steel Co., were additional witnesses who testified last week at hearings on the complaint of the federal trade commission against the United States Steel Corp. with respect to the Pittsburgh basing system. Mr. Lukens said he had been connected with the Alan Wood company for 30 years and that most of his work has been in the sales department.

The company sells most of its semi-finished products on the Atlantic seaboard. This steel is sold on a mill basis and also on a Pittsburgh basis. Plates and sheets are sold by the company in the same way. Prices are made with a Pitsburgh base for the convenience this method affords to customers, but the company will make mill prices. Sometimes, as at present, the company obtains higher prices than its Pittsburgh competitors, while at other times it is forced to quote lower.

Considerable of the Alan Wood company's tonnage is sold on the Pacific coast. Although the company has offices in the Middle West and other parts of the country, they are maintained principally to sell specialties. He said that sales to nearby points net a higher price to the mill as a rule than those to distant points. About 10 or 15 per cent of the company's plate and sheet output is shipped to the Pacific coast. He stated that the company's capacity is 100,000 tons of plates and 100,000 tons of sheets per year. His company is a member of the National Association of Sheet and Tin Plate Manufacturers.

Henry H. Barbour's examination was conducted at the Fifth Avenue hospital, where Mr. Barbour is a patient. He testified that he was associated with the Lackawanna Steel Co. for 20 years in various capacities. Before going with Lackawanna he was a salesman with the Carnegie Steel Co. Mr. Barbour was vice president of the Consolidated Steel Corp., and served as a member of the priorities committee of the war industries board until the end of 1918.

Mr. Barbour said that the Lackawanna Steel Co. always quoted delivered prices based on competition. Sometimes he could obtain higher prices than the Pittsburgh market but sometimes sold at less. During the period he was a salesman in the Carnegie Steel Co.'s Chicago office, 1893 to 1901, he said the Carnegie company quoted delivered prices made up of the Pittsburgh price plus the freight to destination. He was examined at some length on this statement in view of the fact, as stated by counsel for the federal trade commission, that the trade papers quoted delivered prices at Chicago prior to 1901 which were less than the Pittsburgh price plus the freight to Chicago, whereas the trade papers after 1901 quoted prices equivalent to the Pittsburgh price plus the freight.

Idle Freight Cars Exceed Unfilled Orders

Washington, June 5.—Idle freight cars of United States railroads outnumbered unfilled requisitions for cars in the period May 15-23, for the first time since Sept. 1, 1922, according to American Railway association figures. Paradoxially, in this period loadings by the railroads were increased to 991,797 cars, only 27,000 fewer than the high record made in October, 1920.

In the May 15-23 period the daily average shortage of freight cars was 20,585 and the daily average surplus 22,700. The coal car shortage of 14,620 cars daily outbalanced the surplus of 2775, but the surplus of 9084 box cars daily more than offset the shortage of 3973. The loading of 991,797 cars of freight in the week ended May 19 compares with 780,953 cars in the same week of last year. Ore loading is now up to 67,057 cars weekly and climbing at the rate of more than 10,000 weekly. How freight loading so far this year has outstripped the two preceding years is shown by the following table:

Month of:	1923	1922	1921
January	3,380,296	2,785,119	2,823,759
February ...	3,366,965	3,027,886	2,739,234
March	4,583,162	4,088,132	3,452,941
April	3,763,963	2,863,416	2,822,713
Week ended:			
May 5.....	961,029	747,200	721,722
May 12	974,531	767,094	751,186
May 19.....	991,797	780,953	770,991
Total for year to date	18,021,743	15,059,800	14,082,546

Iron Ore Mines Valued at $35,361,522

The total value of iron ore mines on the Marquette range for taxation purposes in 1923 has been fixed by the Michigan state tax commission as $35,768,753, compared with $35,361,522 in 1922. The value for 1923 placed on properties owned or operated by the Cleveland-Cliffs Iron Co., is over $25,000,000. Forty-eight properties are listed by the commission, the largest being Negaunee mine, of the Cleveland Cliffs company, valued at $7,338,000. The Imperial mine, formerly operated by the Cleveland-Cliffs company, and now owned by Henry Ford, is valued at $236,000.

L. M. Serrick, Toledo, O., recently bought the Defiance K. & Z. Automatic Screw Machine Co., Defiance, O., at a receiver's sale. He plans to reorganize the plant and operate it under a new name.

Export Market

On Sulphate of Ammonia Declines—Domestic Prices Unchaned

New York, June 5.—The export market on sulphate of ammonia has eased off slightly, now holding at $3.50 to $3.55 port in double bags. Domestic prices are unchanged, however, at $3.15 to $3.20 f.o.b. works, for spot and around $3 to $3.05, northern plants, and $3.05 to $3.10 southern plants for long term contractors. With the contracting season about over, however, actual trading is light.

Prices on light oil distillates are as follows: Pure benzol, 27 cents works in tanks and 32 cents in drums; 90 per cent benzol, 25 cents in tanks and 30 cents in drums; toluol, 30 cents in tanks and 35 cents in drums; solvent naptha, 27 cents in tanks and 32 cents in drums; and commercial xylol, 29 cents in tanks and 34 cents in drums. Industrial demand continues in fair volume, with supplies of benzol easy.

The drug trade continues the principal buying factor in the naphthalene market, closing on last minute requirements for the cleaning season. Prices are strong but unchanged at around 10 cents works for flakes and 11 cents for balls, in carload lots and one cent higher in less than carload lots.

Coke Oven By-Products

Spot

Per Gallon at Producers' Plants in Tank Lots

Pure benzol	$0.27
Toluol	0.30
Solvent naphtha	0.27
Commercial xylol	0.29

Per Pound at Producers' Plants

Phenol	$0.24
Naphthalene flake	0.10
Naphthalene balls	0.11

Per 100 Pounds at Producers' Plants

Sulphate of ammonia .....$3.15 to $3.20

Contract

Pure benzol	$0.27
Toluol	0.30
Solvent naphtha	0.27
Commercial xylol	0.29

Per Pound at Producers' Plants

Phenol	$0.24
Naphthalene flake	0.10
Naphthalene balls	0.11

Directors of the Youngstown Sheet & Tube Co. have increased the dividend on common stock to $1.25 for the second quarter, this from $1 previously paid. The preferred dividend of 1¾ per cent was declared, both being payable July 1 to stock of record June 15.

May Tool Buying Conservative

Equipment Purchases Were Generally Limited to Single Machines During the Month —Some Large Railroad Business Was Placed—Prospective Demand from the Railroads Is Large—Tool Prices Still Advancing

CONSERVATIVE buying marked trading in machine tools and shop equipment during May. While the volume of business closed was of fair size, fully equallying that of the preceding month, it did not measure up to the March demand, which probably was the heaviest machine tool buying month experienced in some time. Demand from the automotive industry slumped off considerably. This is thought due to the fact most automobile builders filled their machinery requirements early in the spring. General industrial demand also has been of a conservative character, practically all of the business closed being in single machines. The letup in building operations, which was brought about as the result of the efforts of business interests to check threatened inflation of business, is reflected in the machine tool industry in a slump in demand from plumbing goods manufacturers, brass shops, etc.

Prospective Demand Is Large

DESPITE the absence of large buying during the month the outlook for future demand is encouraging, although manufacturers do not agree as to when the resumption of large buying can be expected, some stating June and others August, as the months in which the revival will be noted. However, the large amount of railroad business pending alone is enormous and tool builders generally are fairly sure of obtaining some of this prospective railroad business.

General Industrial Demand Fair

AUTOMOBILE industry buying was limited during the month and so far as can be learned only two automotive builders placed orders of size. These were the Oakland Motor Car Co., Pontiac, Mich., and the Ford Motor Co., Detroit. General industrial demand, while principally for single tools, was of fair size and included orders from the General Electric Co., Schenectady, N. Y., the Celluloid Co., New York, the United Engineering & Foundry Co., Pittsburgh, the Williamson Heating Co., Cincinnati, the National Carbon Co., Cleveland, the General Fire Extinguisher Co., Providence, R. I., the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and the Standard Tool Co., Cleveland. Featuring general tool demand was a number of orders from educational institutions, the Riverdale Technical School, Toronto, Ont., placing a fair-sized order, while the Toronto, Ont. board of education bought a number of machines. Other inquiry current includes one from the Youngstown Sheet & Tube Co., Youngstown, O., another from the Navy department for 12 machines and one from the Warren, O., schools.

Large Railroad Inquiries Current

DURING the past few weeks the Illinois Central railroad has probably been the heaviest tool buyer in the railroad field. In addition to large purchases made during April and March during May it closed on approximately $125,000 additional. Other large railroad buyers were the Central Railroad of New Jersey; the Pullman Co.; the Boston Elevated railway; the Chicago & Northwestern; the American Locomotive Co., New York; the Baldwin Locomotive Co.; Philadelphia; the Louisville & Nashville; the Big Four; the New York Central and the Escanaba & Lake Superior. The large railroad demand in prospect is indicated by the inquiries from these interests. The American Locomotive Co. is inquiring for 12 tools; the Chicago, Burlington & Quincy railroad has asked for quotations on approximately 60 machines; the Pere Marquette has a list out for 79; the Santa Fe has issued two lists both aggregating fully 100 items; the Denver & Rio Grande Western has asked for bids on 147 tools; the Nickel Plate has an inquiry current for 13 machines; the Toronto Transportation commission wants about 100 tools; the Pennsylvania wants 12; the Chicago & Northwestern 16; the Akron, Canton & Youngstown, 7 and the Menominee & Marinette Electric Light & Power Co., Menominee, Mich., has an inquiry current for 10. In addition to these the Lake Erie & Western plans to purchase about $50,000 of machinery; the Elgin, Joliet & Eastern railroad is actively inquiring for a large amount of equipment, the Union Pacific has a large list in circulation, the Chicago, Rock Island & Pacific wants some equipment, and the Southern railroad is preparing a list.

Some Price Advances Made

PRICE advances were made on some lines of machines and tools during May. Tool builders are confronted with a serious problem of keeping skilled labor in their shops at prevailing wages, when outside work at higher wages is being offered the men. This with the steadily advancing costs of production generally has forced some tool builders to announce higher quotations. One of these is the Smith & Mills Co., Cincinnati, which advanced quotations on its line of shapers about 10 per cent. Practically all lines of engine lathes have been advanced from 5 to 15 per cent, while lathes are up 15 per cent, at least one line of turret lathes 10 per cent, and one line of drilling machines, 5 to 10 per cent. Used machinery is being sold approximately 20 per cent under the prices quoted on new tools.

Crane Awards and Inquiries Fair

INTEREST in cranes and allied equipment is fair. While demand during May was not exceptionally large new inquiries to become current were fairly numerous. Despite the lack of large orders during the month a number of crane manufacturers report they are well supplied with orders and in some instances cannot give delivery under 90 days. These are exceptional, however. Most of the business being placed is in single installations and most of the new inquiries call for the same amount. Several large inquiries have come out recently, however, including one for 30 small cranes issued by the Orphuls & Hill, New York, and one from the Baldwin Locomotive Works, Philadelphia, for six overhead electric traveling cranes. The New York Central & Hudson River railroad and the Central Railroad of New Jersey are included in railroads actively inquiring in the crane market for equipment. Several railroads have done considerable purchasing of this type of equipment during the past few months and more is expected.

Tool Inquiry Continues Active

Current Orders Are Few and Limited Generally to Single Machines—Railroad Business in Prospect Is Heavy, Many Large Inquiries from These Interests Being Current—Automotive Demand Lags

INQUIRY for machine tools and shop equipment continues active and sizable, but sales are few and generally confined to single units. A shortage of labor, being experienced by machine tool users, is thought to be the cause of the slump in orders, but many tool builders are of the opinion the market is now experiencing its regular early summer slump and look for a revival in demand in a few weeks. That demand is far from satisfied is indicated by the large amount of inquiry current. True, most of the inquiries from industry in general are for single machines, but the aggregate volume of these is enormous, and it is noticeable that tool purchasers are placing tool inquiries current, one after another, even though their needs are larger. This indicates the average tool user is buying for replacement.

Such is not the case with the railroads. These interests continue to be the large buyers of the market, and their inquiries are exceptionally large. During the past few days the Norfolk & Western railroad entered the market for approximately 45 tools. The Atlantic Coast Line railroad is also inquiring for machinery, while the Union Pacific, the Central Railroad of New Jersey and several others have placed orders. A number of large railroad inquiries are pending on which action is expected to develop before August. These include one from the Pere Marquette, the Chicago, Burlington & Quincy, the Santa Fe and the Union Pacific.

Demand from the automotive industry has shown a decided slump within the past few weeks but a revival of interest in equipment buying on the part of these interests is expected within a few weeks, or at the latest when the fall buying campaigns are started. Due to the fact new machine tool prices are considerably above those for good secondhand machinery, at least 20 per cent, a considerable volume of business is going to dealers in used equipment. Auction sales are fairly numerous and more secondhand tools, many of them in exceptionally good condition, are constantly being thrown onto the market. In the face of this competition from the secondhand machinery dealer, the new tool builder is confronted with a shortage of labor and constantly advancing costs of production.

Norfolk & Western Railroad Wants 45 Machines

NEW YORK, June 5.—Featuring the local machine tool market is an inquiry for more than 45 machine tools and other items for the Norfolk & Western railroad. The equipment, sought through Roanoke, Va., is for proposed shop additions. Another eastern railroad, the Atlantic Coast Line, is inquiring through Wilmington, N. C., for a Hillis & Jones alligator shear, Ajax upsetting and forging machine, and a 4000-pound steam hammer. The Central Railroad of New Jersey has closed on a 6-foot radial drill to one manufacturer, and two 4-foot drills to another. The Union Pacific has closed on several machines to a seller with headquarters in this city.

Trading generally, however, is light, and includes a 36-inch lathe for the United Engineering & Foundry Co., Pittsburgh, four 50-inch vertical milling machines for the Baldwin Locomotive Works and a 53-inch boring mill for the Hallidie Machinery Co., Seattle. The American Locomotive Co. has closed on some equipment for its Montreal plant including a car wheel lathe and a wheel press, placed with an eastern builder, and the Anaconda Copper Mining Co., on a punching and shearing machine. Prices are strong but remain unchanged.

Included in the Norfolk & Western list are four turret lathes, three double-end punch and shears, one car axle lathe, one engine lathe, one cold cut-off saw, two 60-inch radial drills, two 18-inch double floor grinders, one 40-inch rip saw, one 42-inch vertical milling machine, two 16-inch engine lathes, one power press of 50 tons capacity, one 5-spindle car shop wood borer, one revolving oil stone grinder, four 4-spindle automatic machines for finishing pins and bushings, one 500-pound jar molding machine, one 900-pound jar molding machine, one 600-pound steam hammer, two 20-inch engine lathes, and several other machines.

In addition, are two air compressors, one pipe threader and cutter, one double head bolt cutter, one 72-inch inch radial drill, one 24-inch engine lathe, one 36-inch crank shaper, one 48-inch engine lathe, one 72-inch vertical boring mill, and one air hammer. There are also some other miscellaneous items.

In view of the fact a majority of machinery dealers have been anticipating an easing off in demand for machine tools and general shop equipment, the Russell Machine Co., Pittsburgh, recently issued a statement showing the scattered orders for equipment it received in one week recently. A southern user purchased a large plate shear with a capacity of cutting an 8-foot plate 1 inch thick. Another southern interest placed an order for a 10-inch vertical boring mill, while a Chicago buyer took a 10,000-pound Niles steam drop hammer.

While the crane market is apparently not quite as active as last week, a number of orders continue to be placed. An outstanding award calls for five locomotive cranes for the New York Central railroad, and a leading inquiry for 10 special type electrically operated locomotive cranes for the Submarine Boat Corp., Port Newark, N. J.

Slump in Tool Demand Noted

CLEVELAND, June 5.—Trading in machine tools has slumped off considerably during the past week. Practically no large business has been placed and the bulk of

demand has been for single tools. The automobile builders are not buying to any extent, purchases from these interests being for single tools, and these orders are less numerous than they have been. One large manufacturer states that the reason for the slump in demand from the automotive trade is due to the fact the automobile builders early in the spring purchased their needed machinery. Current demand for machinery for future needs is lacking. However, a revival is expected in August. Other industries are not taking machinery in any volume and the railroads are the only real buyers of equipment at this time. Even orders from these interests are limited.

Inquiries in the majority of instances continue restricted to single machines. However, occasionally a larger inquiry is noted. Such inquiries generally come from the railroads. Local tool builders are working on two new railroad lists. One is from the Pennsylvania railroad and asks for 12 tools. The other is from the Chicago-Northwestern railroad which wants quotations on approximately 16 tools. No action yet has been taken on the inquiry of the Pere Marquette railroad, and tool builders still are furnishing quotations on the lists of the Santa Fe, the Chicago, Burlington & Quincy and the Union Pacific railroads. A recent order for three turret lathes was placed by the Deming Co., Salem, O., with a Cleveland manufacturer.

Secondhand machinery continues in fairly heavy demand. Prices on this equipment are considerably below those for new machinery and as a result, shoppers are placing a considerable volume of business with used machinery dealers. The restriction of building operations is being noted in the tool market to some extent. A local tool manufacturer reports that as a result of the curtailment in building operations there has been a noticeable letup in the demand for machine tools from brass shops, etc.

Tool Buying Is Restricted

PITTSBURGH, June 5.—To labor shortage among machine tool and equipment users is attributed the lack of present buying activity since plants cannot keep present equipment engaged to say nothing about employing additional machinery. Sellers of new equipment report the present period more quiet than any during the past year, although the General Electric Co. has purchased lathes for its Erie, Pa., shop; the Pennsylvania railroad has purchased a forging machine for its Pitcairn, Pa., shop, and the Union railroad bought an axle lathe and a car wheel borer. The Pennsylvania is

Crane Awards and Inquiries of the Week

Orders Placed

One 200-ton transfer table and one 15-ton electric crane to the Missouri Pacific railroad, St. Louis; one 50-ton electric crane to the city of St. Paul, Minn.; one 60-ton electric crane to city of Seattle, Wash; one 35-ton electric crane to Philadelphia & Reading railroad, Philadelphia, to the Whiting Corp.

One 3-motor electric bucket crane for 3-cubic yard grab bucket, for the Lake Sand Corp., Chicago, to the Northern Engineering Works, Detroit.

One 5-motor double trolley electric traveling crane with 10 tons capacity with 70-foot span for Roehm & Davidson, Detroit, to the Northern Engineering Works.

One 4-motor, 7½-ton direct current 41-foot span traveling crane for the Des Moines Electric Co., Des Moines, Iowa, to the Northern Engineering Works, Detroit.

One 3-motor, 5-ton, 50-foot span electric traveling bucket cinder-handling and coal handling crane, for the Pere Marquette railroad, to the Northern Engineering Works.

One 2-ton electric traveling crane with 25-foot span for the J. C. Smith Cut Stone Co., Detroit, to the Northern Engineering Works.

One 1-ton single I-beam crane for the Norwood, O., plant of the Allis-Chalmers Co., to the Shepard Electric Crane & Hoist Co.

Five 20-ton locomotive cranes for the New York Central railroad to the Brown Hoisting Machinery Co., three equipped with magnet and two with bucket.

One 25-ton electric gantry crane, 45-foot span, for the Southern Pacific, to the Whiting Corp.

One 40-ton electric crane, 45-foot span, for the Southern Pacific railroad to an eastern builder.

One 25-ton electric crane, 48-foot span, for the Paducah Electric Co., Paducah, Ky., to the Whiting Corp.

One 15-ton trolley for the McMurtrie & Guiler Co., New York city, to the Whiting Corp., for export to Porto Rico.

Two 5-ton single I-beam hoists for Jones & Laughlin, Pittsburgh, to Shepard Electric Crane & Hoist Co.

Several 1-ton hoists for the Morrow Mfg. Co., Wellesston, O., to the Shepard Electric Crane & Hoist Co.

One 15-ton electric crane equipped with two 15-ton trolleys 60-foot span, for the St. Louis plant of the American Car & Foundry Co. to the Champion Engineering Co.

Two 2-ton single I-beam cranes for Humphrey & Co., Joliet, Ill., to Shepard Electric Crane & Hoist Co.

One 30-ton trolley for the United Electric Light & Power Co., St. Louis, awarded through McClellan & Junkerfield, New York city, to the Chesapeake Iron Works.

One 20-ton locomotive crane for the Buffalo plant of the American Radiator Co., to the Industrial Works.

One 20-ton locomotive crane for the Franklin Steel Works, Franklin, Pa., to the Industrial Works.

One 17½-ton locomotive crane for the Buick Motor Co., Flint, Mich., to Industrial Works.

One 15-ton used industrial locomotive crane for the J. G. Brill Co., Philadelphia, placed, the order understood to have gone to Francis O'Brian, a local dealer.

One 12½-ton locomotive crane for the Bethlehem Steel Corp., to Industrial Works.

One 25-ton Browning locomotive crane, 50-foot boom, for the Michigan Paper Box Co., Charlotte, Mich., to Philip T. King, 30 Church street, New York city.

One 7½-ton used Osgood locomotive crane, 40-foot boom, for Landers Egbert Co., Valparaiso, Ind., to Philip T. King, 30 Church street, New York City.

One 10-ton used Byers locomotive crane, 40-foot boom, for Hart Sand Co., Bridgeport, Conn., to Philip T. King.

One 20-ton used industrial locomotive crane and one 15-ton used Ohio locomotive crane for the Alabama Limestone Co., Woodland, Ala., to Philip T. King.

One 25-ton locomotive crane for the Marathon Paper Co., to the American Hoist & Derrick Co.

One ditcher for the Richmond, Fredricksburg & Potomac railroad to the American Hoist & Derrick Co.

One 1-ton electric crane, 23-foot span, for the Fibre Conduit Co., Orangeburg, N. Y., to the New Jersey Foundry & Machine Co.

One 2-ton crane, 18-foot span, for Scheer Bros., Brooklyn, to New Jersey Foundry & Machine Co.

One 30-ton 3-motor electric traveling crane for the Adirondack Light & Power Co., New York, to the Northern Engineering Works, Detroit.

One 10-ton crane with 69½-foot span for the Greenville Steel Car Co., Greenville, Pa., to the Cleveland Crane & Engineering Co., Wickliffe, O.

One 2-line combination bucket and magnet crane for the Donner Steel Co., to the Cleveland Crane & Engineering Co., Wickliffe, O.

One 10-ton overhead crane for the American Steel & Wire Co.'s Schoenberger works, Pittsburgh, to the Cleveland Crane & Engineering Co., Wickliffe, O.

Orders Pending

Three 30-ton locomotive cranes for the Big Four railroad, award expected shortly.

Ten electrically operated locomotive cranes, 16-foot gage, for operation on trestles in connection with cargo handling for the Submarine Boat Corp., Port Newark, N. J., bids asked; several are of 30 tons capacity.

Two 20-ton locomotive cranes for the Chesapeake & Ohio, tentative inquiry reported as being replaced by a firm proposition; cranes are for Huntington, W. Va.; also additional 20-ton magnet locomotive crane pending.

Three 30-ton locomotive cranes, with booms of 40 to 45 feet, for the Central railroad of New Jersey; specifications revised, former inquiry calling for three 20-ton cranes.

One 10-ton electric crane, 50-foot span, with 5-ton alternate for Bergen Point Iron Works, Jersey City; action temporarily postponed.

One 15-ton locomotive crane, boom about 60-feet, for Phoenix Utility Co., 71 Broadway, New York City; bids asked; 2-ton hoist also pending.

One single I-beam crane for a railroad interest, Pittsburgh, bids being taken.

reported to have indefinitely postponed purchases of machine tool equipment for Conway, Pa., although it continues to negotiate for certain equipment for Denniston, O.

As a contrast the used machinery market is active. For instance one dealer reports the sale of a double-end punch and shear to Texas and a 550-foot air compressor with direct motor drive to a machine shop in Virginia. A large interest in Wheeling, W. Va., is in the market for eight or nine tools, including boring mills, radial drills, milling machines, grinders and lathes. It is reported to have purchased two lathes, a milling machine and some sensitive drills recently. The Pittsburg Plate Glass Co. bought an 8-foot radial drill and a user in Ohio bought a 48-inch x 26-inch triple geared lathe. A consumer whose executives issued an order last week to cease buying of equipment has just closed on a large alligator shear and now is inquiring for two other machines. A local user has purchased two 18-inch x 8-foot lathes and one used machinery house reports that not a day goes by but what sales are recorded each involving from $300 up. An Ohio manufacturer has entered this market for a 27-inch lathe, a 42-inch boring mill and one other large machine, while one in Kentucky wants four pieces of equipment including a radial drill, a milling machine and two lathes, one each 24 and 36-inch. The crane market this week is without feature. Few sales are recorded and new inquiries are scarce.

Inquiry Good but Sales Few

BOSTON, June 5.—While most dealers report continued active inquiry, actual sales of machine tools throughout New England have been few and far between during the past week. The structural market has shown a decided improvement and this has carried with it a demand for electric motors and contractor's equipment and also an improved demand for woodworking machinery and for sheet metal tools. Other than this, however, a slight recession is apparent in most industries and tool purchases are being held up. That there is an undercurrent of sound business for summer and fall is shown by the encouraging inquiry which persists from week to week and which authorities agree should develop into active business before the end of this month.

Many automobile parts manufacturers are working overtime, and several of the week's new tool sales have been to these concerns. A Connecticut manufacturer bought a heavy plate straightener and other sheet metal working equipment. The textile machinery builders continue to take occasional tools and three such eastern New England manufacturers each bought a single tool during the week. Stone & Webster Corp. bought a 20-ton crane for a Midwest property. A New England foundry bought a 15-ton crane and several other cranes are up for figures in this market. New England machine tool manufacturers all report conditions holding level. A prominent Worcester tool manufacturer working at 100 per cent capacity reports its production ahead of incoming orders, but has enough orders on hand to carry through the third quarter at its present rate.

Current Demand Is Strong

TORONTO, Ont., June 5.—In so far as actual sales of machinery and tools are concerned the month of May will compare favorably with previous months this year. Local dealers and builders say a strong demand for equipment is being maintained and in addition to the demand of the moment, a good volume of prospective business is in sight. Industrial concerns generally are showing keen interest in their equipment requirements and as a result a brisk demand for tools is reported for replacement purposes, as well as on new works account. During the past week the Toronto Transportation commission received bids on some 100 items of tools and equipment for its new car shops under construction in Toronto, but so far no announcement has been made as to how this business has been placed. The board of education, Toronto, Ont., placed an order with the R. McDougal Co., Galt, Ont., for 10 lathes and another order with D. McKenzie, Guelph, Ont., for 11 lathes for the new Riverdale technical school, while other orders were also issued from the same source for various other lines of equipment.

Building activities among industrial plants throughout Canada continue active and announcements are continually being made regarding new undertakings for which dealers and builders look for a continuation of the present demand for equipment as these interests tend to enter the market. Equipment for woodworking plants is moving freely and dealers have several good inquiries on hand from concerns who will shortly enter the market. The demand for equipment for electrical development projects continues a feature of the market. Small tools are in active demand and individual orders are showing the tendency of buyers to purchase in larger quantities.

The town of Tronbury, Ont., will build a waterworks system, involving the construction of a pump house, filter and the purchase of pumping machinery. Estevan, Sask., J. H. Townsend, engineer, will install an electric power plant and is interested in equipment. The Hull Milling Co., London, Ont., is interested in equipment for an elevator to be erected at Point Edward. The Capital Heating Co., Hull, Que., proposes to erect a manufacturing plant on Montcalm street.

Prospective Demand Not Large

CHICAGO, June 5.—Little prospective buying of machine tools is in sight at Chicago, outside of the inquiries by several railroads. These are unusually plentiful but are slow to close and have not yet yielded much business. The Chicago, Burlington & Quincy railroad has issued a list asking for about 60 items of light and medium weight equipment distributed among its various shops. This includes lathes of many types, millers, boring mills, drill presses, grinders and bolt threaders. The Northwestern railroad has done nothing further with its list since placing the lathes about 10 days ago. Other railroad inquiries still pending include those of the Santa Fe railroad, the Denver & Rio Grande Western; the Union Pacific and the Pere Marquette. Buying of machine tool equipment has declined steadily since March, which was the heaviest month, and May was considerably below the mark established then. With the summer months usually dull the outlook for business is poor.

Bulletin Board

Requests for Equipment and Supplies, Trade Literature, Etc., Made Through IRON TRADE REVIEW

ADVICES have been received from the United Iron Works Inc., Ridge Arcade building, Kansas City, Mo., to the effect it is in the market for two secondhand 100-horsepower 2300-volt, 60-cycle, 3-phase alternating current squirrel cage motors, complete with starter and pulley. These motors are to drive air compressors at 150 revolutions per minute, pulleys on the compressors being 78 inches x 18 inches. F. M. McCall is purchasing agent.

* * *

The Waterbury Foundry Co., Waterbury, Conn., is in the market for a 30 or 36-inch used cupola.

Construction and Enterprise

Concise and Timely Business Building Opportunities from the Field of Industry

East of the Mississippi River

GADSDEN, ALA.—The Ideal Cap Co. has been incorporated with $10,000 capital stock by L. B. Rainey, J. L. Herring and others to manufacture metal caps, etc.

BRIDGEPORT, CONN.—The Forsberg Mfg. Co., Inc., has been incorporated to make metal goods with $100,000 capital by Harold S. Forsberg, Stratford, Conn., W. E. Forsberg and E. W. Forsberg.

HARTFORD, CONN.—The H. P. Townsend Mfg. Co. has let the contract for a brick, 2-story factory addition.

MERIDEN, CONN.—A $50,000 power plant will be erected here by the Connecticut School for Boys.

NEW HAVEN, CONN.—The Andrew B. Hendryx Co. has awarded the contract for a brick, 4-story, 42x50-foot factory addition to cost $40,000.

NEW HAVEN, CONN.—The Excelsior Boiler Works, Inc., has been incorporated with $50,000 capital by Elijah Williams, Sarah Williams and Archibald Hewitt.

NEW HAVEN, CONN.—The Arnold Electric Drill Co. has been incorporated to make tools with $50,000 capital by F. E. Levere, H. A. Waizeneger and E. O. Levere, all of West Haven, Conn.

WALLINGFORD, CONN.—The Dodd-Rogers Co. has awarded a contract for the erection of a 1-story plant building, 42 x 120 feet.

WATERTOWN, CONN.—The Watertown Mfg. Co., Inc., has let the contract for a brick and steel, 1-story factory addition.

GROVELAND, FLA.—The Groveland Light, Power & Ice Co. has let a contract for the erection of a plant.

MIAMI, FLA.—The Electric Signal Mfg. Co. has been incorporated with $50,000 capital stock by H. W. LeVan, R. Gleen Fink and others.

CHICAGO—The American Ladder Co. has increased its capital stock from $25,000 to $50,000.

CHICAGO.—The American Electric Fusion Corp. has icnreased its capital stock from $60,000 to $100,000.

CHICAGO.—The Wever Body Co. has increased its capital stock from $200,000 to $400,000.

CHICAGO—The C. & G. Spring Bumper

Warehouse Steel Prices

Quotations in Cents Per Pound at Leading Market Centers

STEEL BARS

Boston	3.515c
Buffalo	3.55c
Chicago	3.20c
Cincinnati	3.40c to 3.50c
Cleveland	3.36c
Detroit	3.35c
Los Angeles	3.85c
New York	3.54c
Philadelphia	3.55c
San Francisco	4.00c
Seattle	4.10c
St. Louis	3.35c
St. Paul	3.45c

IRON BARS

Boston	3.515c
Buffalo	3.50c
Chicago	3.20c
Cincinnati	3.40c to 3.50c
Detroit	3.35c
New York	3.54c
Philadelphia	3.55c
St. Louis	3.35c

SHAPES, STRUCTURAL

Boston	3.615c
Buffalo	3.65c
Chicago	3.30c
Cincinnati	3.50c to 3.60c
Cleveland	3.46c
Detroit	3.45c
Los Angeles	3.95c
New York	3.64c
Philadelphia	3.65c
San Francisco	4.10c
Seattle (large shapes)	4.20c
St. Louis	3.45c
St. Paul	3.55c

PLATES

Boston	3.615c
Boston 3/16-inch	3.04c
Buffalo	3.65c
Chicago	3.30c
Cincinnati	3.50c to 3.60c
Cleveland	3.46c
Detroit	3.45c
Detroit, 3/16-inch	3.45c
Los Angeles	3.65c
New York	3.64c
Philadelphia	3.65c
Philadelphia, 3/16-inch	3.95c
San Francisco	4.10c
Seattle	4.25c
St. Louis	3.45c
St. Paul	3.55c

NO. 10 BLUE ANNEALED SHEETS

Boston, 3/16-inch	4.615c
Buffalo	4.45c
Chicago	4.35c
Cincinnati	4.10c
Cleveland	3.90c to 4.06c
Detroit	4.30c
Los Angeles	5.20c
New York	4.59c
Philadelphia	4.25c
San Francisco	5.00c
Seattle	4.75c
St. Louis	4.45c
St. Paul	4.60c

NO. 28 BLACK SHEETS

Boston	5.75c
Buffalo	5.25c
Chicago	5.20c
Cincinnati	4.90c
Cleveland	4.75c
Detroit	5.15c
Los Angeles	6.50c
New York	5.15c
Philadelphia	5.15c
San Francisco	6.30c
Seattle	5.75c
St. Louis	5.20c
St. Paul	5.45c

NO. 28 GALVANIZED SHEETS

Boston	6.90c
Buffalo	6.35c
Chicago	6.35c
Cincinnati	5.90c
Cleveland	5.90c
Detroit	6.30c
Los Angeles	7.30c
New York	6.15c
Philadelphia	6.25c
San Francisco	7.15c
Seattle	6.75c
St. Louis	6.35c

BANDS

Boston	4.80c
Buffalo	4.35c
Chicago	3.95c
Cincinnati	4.00c to 4.10c
Cleveland	4.01c to 4.16c
Detroit	4.10c
Los Angeles	4.60c
New York	4.39c
Philadelphia	4.35c
San Francisco	4.75c
Seattle	5.10c
St. Paul	4.20c

HOOPS

Boston	5.80c
Buffalo	4.65c
Chicago	4.55c
Cleveland	4.01c to 4.16c
Detroit	4.95c
New York	5.19c
Philadelphia, 1 inch and wider 20 gage and heavier	4.75c
Seattle	5.50c
St. Paul	4.80c

COLD ROLLED STEEL

Boston (rounds)	4.75c
Boston (shapes)	5.25c
Buffalo (rounds)	4.70c
Buffalo (shapes)	5.20c
Chicago (rounds)	4.55c
Chicago (shapes)	5.05c
Cincinnati (rounds)	4.50c
Cincinnati (shapes)	5.00c
Cleveland (rounds)	4.25c
Cleveland (shapes)	4.75c
Detroit (rounds)	4.55c
Detroit (shapes)	5.05c
Los Angeles (rounds)	5.40c
New York (rounds)	4.65c
New York (shapes)	5.15c
Philadelphia (rounds)	4.35c
Philadelphia (shapes)	4.85c
San Francisco (rounds)	5.50c
Seattle (rounds)	6.00c
St. Paul (rounds)	4.55c

Bourne-Fuller Service

includes immediate shipment of all Iron and Steel materials from Cleveland and Cincinnati

Warehouses

If you are not receiving our Stock-list we shall be glad to send it to you regularly upon request.

Upson Works

Open Hearth Steel Bars for special uses. Also a complete line of Bolts and Nuts. Prompt Shipments.

THE BOURNE-FULLER CO.

Iron, Steel
Pig Iron
Coke

CLEVELAND

New York Chicago Detroit
San Francisco
Cincinnati

Co., 120 West Forty-seventh street, recently was damaged by fire.

CHICAGO—The Badger Mfg. Co. has changed its name to the Badger Tool & Mfg. Co. and increased its capital stock from $6,000 to $25,000.

CHICAGO—The W. A. Jones Foundry & Machine Co. plans the erection of a 1-story machine shop building to be built at an estimated cost of $49,000.

CHICAGO—The Link-Belt Co. has awarded a contract for the erection of a 1-story machine shop to be built at an estimated cost of $150,000.

CHICAGO—F. B. Williams, 2902 Armitage avenue, plans the erection of a 1-story plant addition, 46 x 92 feet, to be built at an estimated cost of $18,000.

CHICAGO—The Flexible Steel Lacing Co., 4607 Lexington avenue, has awarded contracts for the erection of a 1-story plant building, 80 x 140 feet, to be built at an estimated cost of $30,000.

CHICAGO—The Chicago Bearing Metal Co., 2234 West Forty-third street, has started work on the erection of a 1-story addition, 35 x 100 feet, to be built at an estimated cost of $20,000.

CHICAGO—The Wisconsin Steel Works, Torrence avenue, has let a contract for the erection of a 1-story plant addition, 44 x 125 feet, to be built at an estimated cost of $125,000.

CHICAGO.—Whitsett & Co., Inc., 212 North Sheldon street, has been incorporated with $25,000 capital stock by George F. Whitsett, Allan Hall and Ray Maloney to manufacture and deal in iron and steel products, etc. Samuel H. Rosenberg, 10 North Clark street, represents the company.

CHICAGO—The Curtis Leger Fixtures Co., 1115 West Jackson boulevard, is taking bids for the erection of a 6-story factory building, 56x178 feet, to be built at an estimated cost of $225,000. A. D. Curtis is president of the company.

CHICAGO.—The Atlas Bronze Mfg. Co., 412 Orleans street, has been incorporated with $1500 capital stock by Louis E. Price, James L. Price and Charles C. Brecht. The company is represented by Emanuel M. Schwartz, 1001 Conway building.

CHICAGO—A. L. Seaman & Co., Inc., 549 West Washington street, has been incorated with $25,000 capital stock by W. Johnson, A. L. Seaman and F. S. Wayne. The company is represented by West & Eckhart, First National Bank building.

CHICAGO—The Illinois Valve & Mfg. Co., 4247 East Ravenswood avenue, has been incorporated to manufacture and deal in machinery and machine products, with a capital stock of $15,000. The company is represented by Edgar H. Schroeder, Marquette building.

CHICAGO—A. L. Richtmyer, Inc., 35 South Deaborn street, has been incorporated with 60 shares of no par value to manufacture and deal in castings, forgings, etc., by A. L. Richtmyer, E. A. Konst and James G. Gurney. The company is represented by Pringle & Pieruccini, 108 South La Salle street.

CHICAGO—The Portable Adding Machine Co., 208 South LaSalle street, has been incorporated with $660,000 capital stock by George B. McKibbin, William A. Bradford and F. L. Harris. The company is represented by Good, Childs, Bobb & Westcott, 76 West Monroe street.

CHICAGO—The Electric Box & Switch Board Co., Inc., 564 West Monroe street, has been incorporated to manufacture and deal in electric switchboards, etc., by George Meyer Jr., H. L. Johnson and Edward J. Lang. The company is represented by Samuel Wodika, 111 West Washington street.

CHICAGO.—The Chicago Die Casting Mfg. Co., 508 Sangamon street, has been incorporated with $30,000 capital stock by Albert Lorr, Paul E. Koch, Carl F. Beuster and others. The company is represented by Murphy, Altenburg & Power, 7 West Madison street.

CHICAGO—The M. T. Electrical Mfg. Co., 207 South Green street, has been incorporated with $15,000 capital stock by Michael Doyle, Henry Tideman and Andrew Madaras to manufacture and sell electrical devices. The company is represented by the H. T. Electrical Co., 207 South Green street.

CHICAGO.—The Asbestoseal Engineering Co., 164 West Washington street, has been incorporated with $20,000 capital stock by Hiram M. Wheeler, James B. Heffernan and John L. Kemper. The company is represented by James B. Hefferman, 168 West Washington street.

CHICAGO—The Railroad Equipment & Supply Exchange, Inc., 53 West Jackson boulevard, has been incorporated with $12,000 capital stock by P. E. Kroehler, Harry Vissering and R. W. Lyon. The company is represented by Adler, Lederer, Kahn & Adler, 10 South La Salle street.

CHICAGO—The Dependable Burner Co., 29 South La Salle street, has been incor-

Industrial Business Changes Recently Announced

T. M. GRINDLEY Co. is the new name of the organization handling the sale of the products of the Conveyors Corp. of America, Chicago, in the province of British Columbia. The Grindley company was the western office of Gormans, Ltd., Edmonton, and operated under that name May 1.

* * *

Removal of its Milwaukee sales offices from 425 East Water street to room 72, 216-218 West Water street, recently was effected by Kalman Steel Co.

* * *

The Triplex Machine Tool Corp., New York, has appointed the Andrews & George Co., Tokio, Japan, its exclusive sales agents for Japan and Manchuria.

* * *

The Koppers Co. recently opened a district office at 1709 Peoples Gas building, Chicago. Angus MacArthur, formerly superintendent of the coke plant of the Chicago By-Product Coke Co., Chicago, has been appointed district engineer in charge.

* * *

Removal of its offices and warehouse to 151 Bank street, New York City, has been announced by the Poldi Steel Corp. of America.

* * *

S. W. Platt & Co., with a scrap yard at McKees Rocks, Pa., has removed its Pittsburgh office from suite 813 First National Bank building, to 608-609, that building.

* * *

Cleveland sales offices of the Link-Belt Co., Chicago, have been moved from room 429 to room 329 the Rockefeller building, formerly known as the Kirby building.

* * *

Removal of its general offices and manufacturing departments to 1213 Fullerton avenue, Chicago, recently was announced by the Industrial Gloves Corp.

* * *

The White Co., sales subsidiary of the White Motor Co., Cleveland, has moved its foreign department from New York to Cleveland and changed its name to the export dejartment. Jay Rathbun, manager of the department, is moving his office to Cleveland from New York.

* * *

Uehling Instrument Co., Paterson, N. J., has made two important agency appointments, namely Amsler-Morton Co., Fulton building, Pittsburgh, for western Pennsylvania, and John A. MacDowell, 2039 Railway Exchange building, St. Louis, for eastern Missouri and southern Illinois. The W. P. Nevins Co., 120 South Ninth street, Minneapolis, has been appointed to represent the Uehling company in Minnesota and the Dakotas.

* * *

In order to provide more adequate facilities in the Pittsburgh district, the Pennsylvania Crusher Co. recently moved its offices in that city from the Peoples Bank building to the Oliver building. The office continues under the management of H. M. Hallett.

porated with 2500 shares of no par value to manufacture and deal in heating and ventilating devices, by H. J. Donavin, Irving W. Durfee and J. H. Hanson. The company is represented by Donavin & Co., 29 South La Salle street.

CHICAGO, ILL.—The C H D Electric Co. 357 West Sixty-third street, has been incorporated with $100,000 capital stock to manufacture and deal in electric motors and mechanical specialties, by J. Iva Hilyard, Charles A. Cook and others. The company is represented by F. E. Brightman, 1514 First National Bank building.

CHICAGO HEIGHTS, ILL.—The D. G. Foundry Co., 279-281 East Twelfth street, has been incoroporated with $12,000 capital stock by George Gawonis, Richard Gawenis, Dennis K. Lindhout, Benny Gatch, J. A. Dooley, Mike Survil and Pete Bekeza. The company is represented by D. K. Lindhout.

KANAKEE, ILL.—The Kankakee Metal Products Co., 367 South Schuyler avenue, has been incorporated to manufacture and deal in pens, pencils, etc., by Edward G. Ince, R. S. Tuthill and Harold Beacom. The company is represented by Winston, Strawn & Shaw, First National Bank building.

MOLINE, ILL.—The Frank Foundry & Machine Co., 1735 West Second street, Davenport, Iowa, plans to erect a 1-story plant building here, 75x100 feet, at an estimated cost of $15,000. H. J. Frank is president of the company.

PRINCETON, ILL.—The Southern railway will erect a new planing mill here and make improvements to its old mill at an estimated cost of $275,000.

INDIANAPOLIS—The Puritan Bed Spring Co., 902-12 Kentucky avenue, plans to rebuild its plant recently damaged by fire.

LAPORTE, IND.—The Bastian Morley Co. plans the erection of a 2-story plant addition, 55 x 56 feet, to be built at an estimated cost of $43,000.

LOUISVILLE KY.—Buckley Bros., flour mill machinery, has been incorporated with $12,000 capital stock by Ray and F. P. Buckley and M. L. Knapell.

BOSTON—The American Machinery Exchange, Inc., has been incorporated with $25,000 capital by S. E. Shapira, Frances Cohen and Avis M. Callahan, Lynn, Mass.

BOSTON.—The Artisan Metal Products Co. has been incorporated with $15,000 capital by Robert Sinton, Robert G. Lutz and Thomas Cairns, Wakefield, Mass.

BOSTON.—The New England Steel Products Co. has been organized by Harold A. Perkins and William I. McLaughlin, 148 Purchase street.

BOSTON—The Trimont Mfg. Co. has purchased the old Amory street car barn of the Boston Elevated railway and will make extensive improvements for occupancy.

BOSTON—The Simplex Wire & Cable Co., 201 Devonshire street, has awarded a contract for the erection of a 1-story plant building, 36 x 51 feet.

NEW BEDFORD, MASS.—The Allen Wood Working Corp, is having plans drawn for the erection of a 2-story factory building, 50x75 feet, to be built at an estimated cost of $25,000.

NEW BEDFORD, MASS.—The New Bedford Gas & Edison Light Co., 693 Purchase street, plans the erection of a 1-story machine and repair shop.

BALTIMORE—The Mississippi Power & Light Co., Calvert building, has been incorporated by George S. Newcomer, Douglas H. Rose and James Cary.

BALTIMORE.—The Hyle Oil Burner Co., 9 East Lexington street, has been incorporated with $50,000 capital stock by Leonard M. Levering, Howard H. Hyle and Thomas P. Quinn.

SPARROWS POINT, MD.—The Bethlehem Steel Corp. will install a plant here for the absorption of benzol from coke oven gas.

WESTMINSTER, MD.—The Westminster Labeling Machines, Inc., has been incorporated with $50,000 capital stock by Fred H. Knapp, Frank W. Mather and Ervin S. Mummert.

FRANKLIN, N. H.—The G. W. Griffin Co., maker of hack saw blades, is to erect a factory addition and a new building for its tempering department.

NEWARK, N. J.—Property has been purchased on Frelinghuysen avenue by the New Jersey Commercial Body Co. for a site for a new plant, 100 x 280 feet. It will be used in place of the present plant at 235 Elizabeth avenue.

NEWARK, N. J.—The Public Service Corp. of New Jersey has several extensions under contemplation, including an addition to its machine shop at Jersey City and a power plant at Bloomfield, N. J.

NEW BRUNSWICK, N. J.—The Powers Accounting Machine Corp., New York, has taken a long time lease on a plant here owned by the Waltona Works, Inc. The company will move its entire plant from the Flatbush Industrial building in Brooklyn to the new location.

NEW YORK — Work will be started shortly by the New York Edison Co. on a $150,000 power plant at 49-51 Park Place.

NEW YORK.—The Purvis Machine Co., Inc., has been incorporated with $200,000 capital stock by George R. Grennan, 44 Court street, Brooklyn, N. Y.

NEW YORK.—The United Electric Light & Power Co. will start work shortly on an addition to its Hell Gate power plant. The steel contract, involving about 200 tons, has been placed with the Phoenix Bridge Co.

NEW YORK.—The Western Electric Co. has established offices at 110 William street, to take charge of the construction of its proposed plant at Kearny, N. J. Work on the first unit, which will involve about 1500 tons, is expected to get under way shortly.

TROY, N. Y.—Property adjacent to the Ford Motor plant at Green Island, near here, has been acquired by the Edison Storage Battery Co., West Orange, N. J., as a site for a plant.

CHARLOTTE, N. C.—Contract for a $50,000 power plant has been awarded the Electrical Construction Co. of this city, by E. W. Thompson of Shulls Mills, S. C.

WAYNESVILLE, N. C.—Plans have been completed for a hydroelectric power development by the Pidgeon River Power Co., capitalized at $50,000.

AKRON, O.—The R. H. Freitag Mfg. Co. has been incorporated with $10,000 capital stock by W. L. Willkie, L. A. Fassett, G. L. Keller, L. A. Martin and G. M. Neal.

AKRON, O.—The Trump Rubber Co. has been incorporated with $200,000 capital stock by Ross M. Trump, Fred G. Alderfer, Elno H. Trump, Willis Bacon and Fred Alderfer Jr.

BELLAIRE, O.—The Bellaire Enamel Co. plans the erection of an addition to its plant.

CAMBRIDGE, O.—The Cambridge Stripping & Mining Co., has increased its capital stock from $5000 to $20,000.

CLEVELAND.—The plant of the Grant Motor Car Corp. has been purchased by the Lincoln Electric Co. which will utilize it for its own use.

CLEVELAND.—The Smokeless Fuel Saving Appliance Co. has been incorporated with $1000 capital stock by Jacob Kastriner, A. R. Wallach, M. W. Kastriner, G. Rhodes and Julius Kastriner.

CLEVELAND.—The Great Lakes Rubber Products Co. has been incorporated with $1000 capital stock by Emanuel F. Wohlwerth, Sadye L. Wohlwerth, Frank J. Hoban, Harry Green and Rae Bernsteen.

DEFIANCE, O.—The Defiance Automatic Screw Co. has been incorporated with $15,000 capital stock by C. W. Zeller, L. C. Brown, A. M. Minsel, H. A. Spangler and L. F. Serrick.

FREDERICKSBURG, O.—The Fredericksburg Mining & Clay Products Co. has been incorporated with $10,000 capital stock by Paul C. Shaffer, Nina Hibold, William D. Pence, Willis Bacon and Luke A. Floyd.

ROOTSTOWN STATION, O.—The Rootstown Light & Power Co. has been incorporated with $3000 capital stock by Andrew Kraiss, Mabel Kraiss, Maxine Kraiss and others.

TOLEDO, O.—The James Scanes Boat & Dock Co. has been incorporated with $30,000 capital stock by James Scanes Jr., Fanny L. Scanes, Joseph H. Scanes, S. J. Scanes and Grace Scanes.

LYKENS, PA.—Work will be started in June on a $350,000 plant for the American Briquette Co. The plant, which it is hoped will be in operation by September, will be of steel and concrete construction, and will replace the company's property badly damaged several months ago by fire.

MIDDLETOWN, PA.—The Metropolitan Edison Co. will start work shortly on a power plant. The steel contract, involving about 1000 tons, has just been finished by the Bethlehem Steel Corp.

PHILADELPHIA.—Bids were received May 31 by R. J. Lawrence, architect, for a warehouse and siding for J. P. Holt, Inc.

PHILADELPHIA — The General contract for a $20,000 factory for Bernheim Sons & Co. has been awarded to N. Nardy & Co.

PHILADELPHIA.—H. M. Miller & Co., architects, have closed bids on a factory addition to be erected at Ninth and Noble.

PHILADELPHIA—A $15,000 warehouse will be erected here by the F. P. Mellon estate. The general contract has been awarded to George L. Daugherty.

PHILADELPHIA—The Emergency Elevator Co. has awarded a contract to Clayton Lofland for the erection of a $12,000 plant addition.

PHILADELPHIA — General contract for a $10,000 plant addition for Stephen Whitman & Co. has been awarded to Wm. Steele & Sons Co.

PITTSTON, PA.—The Martin Parry Body Sales Co. has established a plant here to make standardized bodies for light trucks.

GREENVILLE, S. C.—The general contract for the erection of a $1,000,000 plant has just been let by the Arcadian Mills. The proposed work will include a 3-story cotton mill, three warehouses and a boiler house.

KNOXVILLE, TENN.—The Foster Foundry Co. has been incorporated with $2000 capi-

tal stock by Land Foster, C. L. Nickle, Wayne Parkey and James Webster Jr.

NORFOLK, VA.—Plans are being prepared by the Norfolk Sugar Refining Co. for the erection of a large refinery here along the water front. The company is incorporated with $3,500,000 capital and John J. Lenithan, New York City, is president.

BEAVER DAM, WIS.—Bids are being taken for a small quantity of metal and woodworking machinery for the new vocational school here.

MILWAUKEE.—A 1-story addition, 40 x 75 feet, will be erected by the R. J. Schwab & Sons Co., maker of heating boilers and furnaces at 287 Clinton street.

MILWAUKEE.—A new forge shop, 48 x 80 feet, will be erected at 487 National avenue by the Thurner Heat Treating Co., now operating at 126 Ferry street.

MILWAUKEE.—The common council is considering a request from the commissioner of public works for an appropriation of $25,000 to replace the four hydraulic passenger ele-

Iron and Steel Prices

Iron Ore

LAKE SUPERIOR ORES

Per Gross Ton Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Mesabi Bessemer, 55 per cent iron	6.20
Old Range nonbessemer, 51½ per cent iron	5.70
Mesabi nonbessemer, 51½ per cent iron	5.55

EASTERN LOCAL ORES

Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 53 to 63 per cent	10.00 to 11.00
Copper free low phosphorus 53 to 65 per cent	13.25 to 16.50

FOREIGN IRON ORE

Cents per unit, c.i.f. Atlantic ports

Spanish low phosphorus, 52 to 54 per cent	nominal
Algerian low phosphorus, 52 to 54 per cent	nominal
Swedish and Norwegian low phosphorus, 68 per cent	nominal
Swedish foundry or basic, 66 to 68 per cent	11.25
Spanish foundry or basic, 50 to 54 per cent	nominal

Manganese Ore

Prices do not include duty at rate 1 per cent per pound of metallic manganese contained.

Brazilian, minimum 47 per cent	nominal
Indian, minimum 47 per cent	42 cents c.i.f. tidewater
Caucasian, 53 to 55 per cent.	nominal

Fluor Spar

85 and 5% grade

Washed gravel, Kentucky and Illinois mines, per ton	21.50 to 22.00

Rivets

Structural rivets, Pittsburgh	3.25c
Boiler rivets, Pittsburgh	3.35c
Rivets, 7/16-in. and smaller	60 and 5 off

Nuts and Bolts

NUTS

(Up to 1¼ and 1⅛ inches inclusive)

Hot pressed square or hexagon blank	$3.00 off list
Hot pressed square or hexagon tapped	$2.75 off list
Cold punched square or hexagon blank	$3.00 off ilat
Cold punched, square or hexagon, tapped	$2.75 off list
Cold punched semifinished hexagon nuts ⅝-inch and larger	70-10-2½ off
Cold punched semifinished hexagon nuts 9/16-inch and smaller	70-10-5 off

Price f.o.b. Pittsburgh, Packages of 50.

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	45 off
Cut thread	40 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50 off
Cut thread	40-10 off
Larger and longer	40-10 off

(⅜ x 4 inches, cold punched nuts)

Cut thread	35-5 off
Larger and longer	35-5 off
Lag screws	50 off
Plow bolts Nos. 1, 2 and 3 heads	40-10 off
4 to 10 heads	40-10+20 off
Stove bolts	75-5 off
Tap bolts	25 off
Bolt ends with hot pressed nuts	40-10 off
Bolt ends with cold punched nuts	35-5 off
Blank bolts	40 off
Rough stud bolts with nuts	40 off

WASHERS

Wrought washers	$4.85 to $5.00 off

Steel Pipe

(First column*—effective March 19, 1923)
(Second column—effective April 19, 1923)
*Wheeling Steel Corp. discounts.
Pittsburgh basing discounts, jobbers' carloads.

	Butt Weld Black	Galvanized
⅛-inch	44 to 45	18½ to 19½
¼ and ⅜-inch	50 to 51	24½ to 25½
½-inch	55 to 56	41½ to 42½
¾-inch	59 to 60	47½ to 48½
1 to 3-inch	61 to 62	49½ to 50½
Lap Weld		
2-inch	54 to 55	42½ to 43½
2½ to 6-inch	58 to 59	46½ to 47½
7 to 8-inch	55 to 56	42½ to 43½
9 and 10-inch	54 to 54	41½ to 41½
11 and 12-inch	54 to 53	41½ to 40½
REAMED AND DRIFTED		
Butt Weld		
1 to 3-inch	59 to 60	47½ to 48½
Lap Weld		
2-inch	52 to 53	40½ to 41½
2½ to 6-inch	56 to 57	44½ to 45½
EXTRA STRONG—PLAIN ENDS		
Butt Weld		
⅛-inch	40 to 41	23½ to 24½
¼ and ⅜-inch	46 to 47	29½ to 30½
½-inch	52 to 53	41½ to 42½
¾-inch	57 to 58	46½ to 47½
1 to 1½-inch	59 to 60	48½ to 49½
2 to 3-inch	60 to 61	49½ to 50½
Lap Weld		
2-inch	52 to 53	41½ to 42½
2½ to 4-inch	56 to 57	45½ to 46½
4½ to 6-inch	55 to 56	44½ to 45½
7 to 8-inch	51 to 52	38½ to 39½
9 and 10-inch	45 to 45	32½ to 32½
11 and 12-inch	45 to 44	32½ to 31½
DOUBLE EXTRA STRONG		
Butt Weld		
½-inch	41 to 42	31½ to 32½
¾ to 1½-inch	44 to 45	34½ to 35½
2 to 2½-inch	46 to 47	36½ to 37½
Lap Weld		
2-inch	40 to 41	31½ to 32½
2½ to 4-inch	42 to 43	33½ to 34½
4½ to 6-inch	41 to 42	32½ to 33½
7 to 8-inch	37 to 38	24½ to 25½

Wrought Iron Pipe

(Effective Jan. 23, 1923)

Pittsburgh basing discounts, jobbers, carloads

THREADS AND COUPLINGS

	Butt Weld Black	Galvanized
⅛ and ⅜-inch	+11	+39
½-inch	22	2
¾-inch	28	11
1 to 1½-inch	30	13
Lap Weld		
1¼ and 1½-inch	Upon application	
2-inch	23	7
2½ to 6-inch	26	11
3 to 6-inch	28	13
7 to 12-inch	26	11

PLUGGED AND REAMED

Two points less than above

EXTRA STRONG, PLAIN ENDS

	Butt Weld	
⅛ and ⅜-inch	+19	+54
½-inch	21	7
¾-inch	28	12
1 to 1½-inch	30	14
Lap Weld		
2-inch	23	9
2½ to 4-inch	29	15
4½ to 6-inch	28	14
7 to 8-inch	21	7
9 to 12-inch	16	2

DOUBLE EXTRA STRONG

	Butt Weld	
½-inch	+47½	+59½
¾-inch	+28	+40
1-inch	+34	+46
1¼-inch	+28	+40
1½-inch	+27	+39
Lap Weld		
2 and 2½-inch	+13	+25
3 to 4-inch	+ 8	+17
4½ to 6-inch	+ 9	+18
8-inch	+12	..

Boiler Tubes

L. C. L. discounts. C. L. 4 points larger

STEEL (Lap welded)

(Effective April 19, 1923)

2 and 2¼-inch	23 off
2½ and 2¾-inch	33 off
3-inch	36 off
3¼ to 3¾-inch	38½ off
4 to 13-inch	42 off

CHARCOAL IRON

(Effective April 12, 1923)

1⅛-inch	+22
1¼-inch	+12
2 and 2¼-inch	+ 2
2½ to 3-inch	3
3¼ to 4½-inch	5

SEAMLESS COLD DRAWN

(Effective April 19, 1923)

1-inch	51 off
1¼ and 1½-inch	43 off
1¾-inch	27 off
2 and 2¼-inch	18 off
2½ and 2¾-inch	28 off
3 and 3¼-inch	32 off
3½ and 3¾-inch	33 off
4-inch	37 off
4½ and 5-inch	29 off

SEAMLESS HOT ROLLED

3 and 3¼-inch	34 off
3½ and 3¾-inch	35 off
4-inch	39 off

SEAMLESS STEEL MERCHANT BOILER TUBES

Extras:

Add $8 per net ton for more than four gages heavier than standard and add 10 per cent to theoretical weight.

Add 5 per cent for lengths over 24 feet and not over 26 feet.

Smaller tubes than 1-inch and lighter than standard gage to be sold at mechanical tubing list and discount.

Intermediate sizes and gages not listed above take price of next larger outside diameter and heavier gage.

SEAMLESS STEEL MECHANICAL TUBING

Base Discounts

Carbon, 0.10 to 0.20 per cent	83 off
Carbon, 0.30 to 0.40 per cent	81 off
Carbon, 0.40 to 0.50 per cent	80 off

Plus differentials and extras for cutting

SEAMLESS STEEL LOCOMOTIVE AND SUPER-HEATER TUBES

(Effective April 19, 1923)

Outside diameter	Net prices per foot, f.o.b. Pittsburgh Gage	Price
2-inch	12-gage	15c
2-inch	11-gage	16c
2-inch	10-gage	17c
2¼-inch	12-gage	17c
2¼-inch	11-gage	18c
2¼-inch	10-gage	20c
3-inch	7-gage	35c
1½-inch	9-gage	15c
5⅜-inch	9-gage	55c
5½-inch	9-gage	57c

Plus usual extras for forming and for long lengths.

Loads 2100 Tons Cost $10.00

Half a cent a ton!

That's loading—economically.

In these days of rising costs—and prices—can you do better than put a Link-Belt Power Swiveling Loader to work for you?

Read the letter from the York Stone & Supply Co. Then write us—if you are interested in loading any material from ground to trucks or wagons.

YORK STONE AND SUPPLY COMPANY
DEALERS IN ALL KINDS OF
BUILDING AND MACADAMIZING STONE
OFFICE: NORTH HARTLEY STREET

York, Pa. Feb. 21st, 1923.

Link-Belt Company,
Nicetown, Philadelphia,
Pa.

Gentlemen:-

It affords me pleasure to write you a few lines relative to the ability and economy of your Link-Belt Power Swiveling Loader.

We had in stock on the first of April, 1922, upward of 15,000 tons of crushed stone stored, and in our busy season for three successive days this machine handled 700 tons daily.

All material was loaded on trucks, and the operation was confined to a one-man operation.

The cost, plus the current consumed, when the machine was recently overhauled, was less than $10.00 for handling the above material.

This machine has answered our purpose in every respect, and should you at any time have a customer whose conditions are similar to ours, and care to refer him to us, the best we could do is speak well of this type of loader.

Yours truly

YORK STONE & SUPPLY CO.

Manager

1216

LINK-BELT COMPANY

PHILADELPHIA, 2045 Hunting Park Ave.

New York	Woolworth Bldg.	Wilkes-Barre	2nd Nat'l Bank Bldg.
Boston 9	49 Federal St.	Huntington, W. Va.	Robson-Prichard Bldg.
Pittsburgh	335 Fifth Ave.	Cleveland	429 Kirby Bldg.
St. Louis	Central Nat'l Bank Bldg.	Detroit	4210 Woodward Ave.
Buffalo	745 Ellicott Square	Kansas City, Mo.	306 Elmhurst Bldg.

Canadian Link-Belt Co., Ltd., Toronto and Montreal

CHICAGO, 300 W. Pershing Road

Seattle	820 First Ave., S.	Atlanta	610-11 Citizens and Southern Bank Bldg.
Portland, Ore.	101 First St.	Louisville, Ky.	Frederick Wehle, Starks Bldg.
San Francisco	108 Second St.	New Orleans	C. O. Hinz, 504 Carondelet Bldg.
Los Angeles	143 N. Los Angeles St.	Birmingham, Ala.,	S. L. Morrow, 720 Brown-Marx Bldg.
Denver	Lindroth, Shubart & Co., Boston Bldg.		

H. W. CALDWELL & SON CO., CHICAGO

NEW YORK, Woolworth Bldg.

INDIANAPOLIS, Belmont Ave. at Big Four R. R.

DALLAS, TEXAS, 700 Main St.

LINK-BELT

vators in the city hall with electric lifts.

MILWAUKEE.—A machine shop, 60 x 160 feet, will be erected at Thirty-sixth and Sycamore streets by the Rohn Auto Renewal Co., now in leased quarters at 711-713 Chestnut street.

RACINE, WIS.—George E. H. Nelson will build a service garage and repairshop, 60 x 120 feet, at 3009 Washington avenue, West Racine, costing about $20,000 complete.

REESEVILLE, WIS.—Bids are being taken until June 1 by A. C. Buss, village clerk, for two pumping units and a 60,000 gallon steel tank on a 115-foot steel tower as part of extensive water plant work being done under the supervision of E. B. Parsons, consulting engineer, Jefferson, Wis.

RHINELANDER, WIS.—Mead & Seastone, consulting engineers, Madison, Wis., are ready to start work on a $50,000 addition to the hydroelectric generating plant of the Rhinelander Electric Light & Power Co.

SHEBOYGAN, WIS.—The Eastern Wisconsin Electric Co., L. F. Fessenden, chief engineer, is starting a $200,000 improvement project requiring considerable boiler and engine equipment. Sargent & Lundy, 72 West Adams street, Chicago, are consulting engineers.

WEST BEND, WIS.—The West Bend Equipment Co. has been incorporated with $75,000 capital to manufacture litter carriers and other barnyard, stable and general farm specialties. M. W. Walter, O. A. Klein and H. Regner are the incorporators.

West of the Mississippi

ST. LOUIS.—The Arkansas-Missouri Power Co. has been incorporated with $350,000 capital stock by J. M. Moore, E. J. Badman and others.

DALLAS, TEX.—The Aluminum Specialty Co. has been incorporated with $30,000 capital stock by G. Blanchard, A. Lamaitre and others.

CHEHALIS, WASH.—The Chehalis Machine Works, Inc., has been incorporated with $10,000 capital stock by Henry L. Alldie and E. T. Trimble.

TACOMA, WASH.—The Pacific Foundry Co. has been incorporated with $8000 capital stock by John Borges, W. H. Allard and Samuel Fick.

Large Tool List Current

SIXTY-ONE heavy machine tools are being inquired for by the Chicago, Burlington & Quincy railroad. The list is as follows:

One 16-inch portable engine lathe.
Eight 18-inch engines lathes.
One 24-inch engine lathe.
One 16-inch engine lathe.
One 24-inch engine lathe.
One 30-inch engine lathe.
One 36-inch engine lathe.
One 2-inch x 24-inch turret lathe.
One universal turret lathe.
One special turret lathe.
One 2½-inch turret lathe.
One heavy duty turret lathe.
One thread miller.
Three double spindle bolt threaders.
Two horizontal type bolt threaders.
One pipe threader.
One pneumatic pipe threader.
One slotting machine, 18-inch stroke.
One vertical type boring mill.
One 48-inch boring mill.
One 53-inch boring mill.
Two 42-inch vertical turret lathes.
Five 32-inch crank shapers.
Seven 34-inch upright drill presses.
Two 26-inch upright drills.
One 20-inch upright drill.
One 36-inch upright drill.
One belt-driven post drill.
One 54-inch vertical adjustment milling machine.
One heavy duty universal milling machine.
One vertical type surface grinder,
One double-end pedestal grinder.
One power hack saw.
One double spindle cotter drill.
One portable boring machine.
One single end bar axle lathe.
One car wheel borer, 52 inches capacity.
One squaring shear.
One cornice brake.

Business in Canada

WINNIPEG, MAN.—The Vulcan Iron Works, is installing an electric smelting plant here.

BELLEVILLE, ONT.—Collins Motor Products, Ltd., has been incorporated to manufacture automobile bodies with $250,000 capital stock. Provisional directors are Clifford E. Jordon, Herbert Capewell, Clement L. Booth of Toronto and others.

CHATHAM, ONT.—The Bradford Electric Co., Ltd., has been incorporated with $200,000 capital stock by James D. Broadfoot, Robert J. Owen, Harold V. Daley and others.

CHATHAM, ONT.—The Broadfoot Electric Co., Ltd., has been incorporated to manufacture and deal in engines, dynamos, generators, electrical equipment, etc., with $200,000 capital stock; by James D. Broadfoot, Robert J. Owen, Harold V. Dalley and others.

CHATHAM, ONT.—The Canadian Des Moines Steel Co., has been awarded a contract for construction of a waterworks plant at Hanover, Ont., to cost $135,000. The contract for turbines has been awarded to William Kennedy & Sons, Owen Sound, Ont.

HURON, ONT.—Universal Mill Co. Ltd., has been incorporated to carry on business as iron-founder, mechanical engineer and manufacturer of machinery, with $5000 capital stock, by Frederick A. Day, Joseph P. Walsh, Thomas M. Mungovan of Toronto and others.

New Trade Publications

ROOF VENTILATORS.—The Tarpenning-LaFollette Co., Indianapolis, has published a 4-page illustrated folder in which roof ventilators are described and illustrated. These are made in either stationary or rotary types. In addition to this bulletin the company has published a 32-page illustrated booklet in which dust collecting systems, ventilating, drying specialties and other industrial sheet metal work is described and illustrated. The company manufactures complete systems for dust and shavings collection, ventilating, heating or drying for industrial plants.

ROLLER LEVELER.—A 2-page illustrated folder has been published by the Erie Foundry Co., in which a roller leveler is described and illustrated. This leveler consists of a set of rolls, 17 in number, through which the sheet is passed. The distance between the top and bottom bank of rolls is adjustable, each end independent of the other and the sheet passing through the rolls is first corrugated and then the corrugations flattened out, thus breaking up the hard surface and then leaving the sheet in perfect condition for drawing.

MOLDING MACHINE.—A large 28-page illustrated booklet has been published by the Beardsley-Piper Co., Chicago, in which a sand-slinger molding machine is described and illustrated. According to the booklet this machine throws 750 to 1800 handsful of sand per minute. It can ram flasks of any size, and it does not require deep and expensive pits and heavy foundations. It is built in four types: Stationary, tractor, portable and locomotive. The various types are described in some detail and the illustrations show them in actual operation.

OVENS.—The F. A. Coleman Co., Cleveland, has published a 44-page illustrated booklet in which foundry ovens, both for core baking and mold drying are described and illustrated. The company manufactures ovens designed for use with any fuel. According to the booklet three types of ovens are in use today; rolling drawer, rack and car ovens. Each of these types is described in detail and is fully illustrated. The booklet also calls attention to the miscellaneous and special types of ovens which the company manufactures. A partial list of users of these ovens is given in the back of the booklet.

AMMETER.—A 4-page illustrated folder has been published by the Roller-Smith Co., New York, in which a triplex ammeter for three-phase alternating current circuits is described and illustrated. In the description, it is stated that it is possible to take readings in three phases simultaneously; that the ammeter occupies but little space and possesses the advantages of three individual ammeters, in that any one of the three mechanisms can be removed without interruption of the circuit; that each mechanism is insulated from the others; that while developed for high tension metering circuits it can be used in low tension three phase circuits in connection with suitable current transformers; and that it has high overload capacity.

ENGINE LATHE.—The Myers Machine Tool Corp., Columbia, Pa., has published a 4-page illustrated folder in which a 10-inch engine lathe with quick change gears, 24 inches between centers is described and illustrated. It has a massive head; bearings are unusually large for a machine of its size; the spindle is of open-hearth high carbon steel bored from the solid metal and ground; the tailstock is of heavy design with long bearings for tailstock spindle; the carriage has long bearings on ways and all sliding surfaces are planed and scraped; the compound rest is graduated and is held in position by two clamp bolts; the bed is wide and deep and is securely braced and ribbed so as to insure rigidity under heavy cut, while the countershaft is provided with forward and reverse friction pulleys.

Budd Stampings

When you order your stampings from THE BUDD COMPANY you secure, not only an immense saving of material, but also an elimination of that costly bugbear called DIE MAINTENANCE.

You undoubtedly are aware that one of the principal items that enters into the cost of stampings, is the DIE UPKEEP COST!

Our experience has taught us that dies should be cared for by the people who make and operate them. Therefore, on all dies we make and operate *we assume all maintenance and replacement cost.*

Then

LET THE BUDD COMPANY MAKE YOUR STAMPINGS and cut out all die maintenance cost!

Just send us samples or drawings and we shall be glad, promptly, to estimate on your stampings.

eliminate that Heavy Expense for

Die Maintenance

ADDRESS

SPECIALTY DEPARTMENT

EDW. G. BUDD MFG. CO.

Makers of All-Steel Automobile Bodies

PHILADELPHIA, PA.

Iron and Steel Scrap Prices

CORRECTED TO TUESDAY NOON GROSS TONS DELIVERED TO CONSUMER

Steel Works Scrap

HEAVY MELTING STEEL

Birmingham	18.50 to 19.00
Boston (dealers)	14.50 to 15.00
Buffalo	20.00 to 20.50
Chicago	18.50 to 19.00
Cleveland	19.00 to 19.50
Cincinnati	18.00 to 18.50
Detroit (dealers)	17.50 to 18.00
Eastern Pennsylvania	18.50 to 20.00
New York (dealers)	15.00 to 15.50
Pittsburgh	21.00 to 21.50
St. Louis	17.50 to 18.00
Valleys (nominal)	22.00
(dealers)	15.50 to 16.00

BUNDLED SHEETS

Buffalo	$16.25 to 16.75
Cleveland	12.75 to 13.00
Cincinnati	14.00 to 14.50
Detroit	15.50 to 16.00
Eastern Pennsylvania	16.50 to 17.00
Pittsburgh	18.00 to 18.50
St. Louis	13.00 to 13.50
Valleys	17.00 to 17.50

STEEL RAILS, SHORT

Birmingham	$18.00 to 20.00
Boston (dealers)	14.50 to 15.00
Chicago	21.50 to 22.00
Cincinnati	23.00 to 23.50
Cleveland	17.50 to 17.75
St. Louis	20.00 to 20.50

STOVE PLATE

Birmingham	18.00 to 19.00
Boston	18.00 to 18.50
Buffalo	20.00 to 21.00
Chicago	18.00 to 18.50
Cincinnati (net tons)	12.50 to 13.00
Cleveland	17.00 to 17.50
Detroit (net ton) (dealers)	16.00 to 16.50
Eastern Pennsylvania	17.00 to 18.00
New York (dealers)	14.00 to 15.00
Pittsburgh	17.00 to 17.50
St. Louis	17.50 to 18.00

LOW PHOSPHORUS

Buffalo	26.00 to 27.00
Cincinnati	18.00 to 19.00
Eastern Pennsylvania	25.00 to 26.00
Pitts. billets and bloom crops	25.00 to 25.50

SHOVELING STEEL

Chicago	18.00 to 18.25
Pittsburgh	18.00 to 18.50
St. Louis	17.00 to 17.50

KNUCKLES, COUPLERS & SPRINGS

Chicago	24.00 to 24.50
Eastern Pennsylvania	24.00 to 25.00
Pittsburgh	23.50 to 24.00
St. Louis	23.50 to 24.00

COMPRESSED SHEETS

Buffalo	19.50 to 20.50
Chicago	16.50 to 17.00
Pittsburgh	19.50 to 20.00
Cleveland	17.75 to 18.25
Detroit (dealers)	18.00 to 18.50
Valleys (nominal)	20.50 to 21.00

FROGS, SWITCHES, GUARDS

Chicago	18.25 to 18.75
Eastern Pennsylvania	18.50 to 20.00
St. Louis	18.00 to 18.50

BOILER PLATE, CUT

St. Louis	13.00 to 13.50

ANGLE BARS—STEEL

Chicago	20.50 to 21.00
St. Louis	19.00 to 19.50

Iron Mill Scrap

RAILROAD WROUGHT

Birmingham	18.00 to 19.00
Boston (dealers)	17.00 to 18.00
Buffalo	20.00 to 21.00
Chicago, No. 1	17.50 to 18.00
Chicago, No. 2	18.50 to 19.00
Cincinnati No. 1	15.00 to 16.00
Eastern Pennsylvania, No. 1	23.00 to 24.00
Pittsburgh, No. 1	21.00 to 21.50
Pittsburgh No. 2	21.00 to 21.50
New York, No. 1 (dealers)	20.75 to 21.25
St. Louis, No. 1	18.50 to 19.00
St. Louis, No. 2	18.00 to 18.50

WROUGHT PIPE

Boston (dealers)	11.00 to 11.50
Buffalo	17.00 to 18.00
Eastern Pennsylvania	15.00 to 16.00
New York (dealers)	12.00 to 13.00

YARD WROUGHT

Boston	15.00 to 16.00
Eastern Pennsylvania	19.00 to 20.00

CITY WROUGHT

New York, long	$18.00 to 18.50

BUSHELING

Buffalo, No. 1	19.00 to 20.00
Chicago, No. 1	18.00 to 18.50
Chicago, No. 2	13.50 to 14.00
Cincinnati No. 1	14.50 to 15.00
Cleveland, No. 1	16.25 to 16.50
Cleveland, No. 2	14.00 to 14.50
Detroit, No. 1	15.50 to 16.00
Detroit, No. 2 (new)	13.00 to 13.50
Detroit, No. 2 (old)	12.00 to 12.50
Eastern Pennsylvania	20.00 to 21.00
Pittsburgh, No. 1	16.50 to 17.00
St. Louis, No. 1	16.00 to 16.50

MACHINE SHOP TURNINGS

Birmingham	12.00 to 13.00
Boston (dealers)	12.00 to 12.50
Buffalo	17.50 to 18.00
Chicago	12.50 to 13.00
Cleveland	16.50 to 16.75
Cincinnati (net ton)	12.00 to 12.50
Detroit (dealers)	13.00 to 13.50
Eastern Pennsylvania	16.50 to 17.50
New York (dealers)	14.50 to 15.00
Pittsburgh	17.50 to 18.00
St. Louis	13.00 to 13.50
Valleys	17.00 to 17.50

CAST IRON BORINGS

Birmingham (chemical)	18.00 to 20.00
Birmingham borings (plain)	12.00 to 13.00
Boston (chemical)	14.00 to 14.50
Boston (dealers)	13.50 to 14.00
Buffalo	19.00 to 20.00
Chicago	15.00 to 15.50
Cincinnati (net tons)	13.00 to 13.50
Cleveland	16.75 to 17.00
Detroit (dealers)	14.00 to 14.50
Eastern Pennsylvania	17.50 to 18.00
Eastern Pennsylvania (chem.)	20.00 to 21.00
Pittsburgh	18.00 to 18.50
New York (dealers' price)	14.00 to 14.50
St. Louis	14.50 to 15.00
Valleys	18.50 to 18.75

MIXED BORINGS AND TURNINGS
(For blast furnace use)

Boston (dealers)	13.50 to 14.00
Cleveland	16.75 to 17.00
Detroit (dealers)	13.50 to 14.00
Eastern Pennsylvania	17.00 to 18.00
New York (dealers)	13.50 to 14.00

IRON AXLES

Birmingham	28.00 to 29.00
Boston (consumers)	31.00 to 32.00
Buffalo	30.00 to 31.00
Chicago	32.00 to 32.50
Cincinnati	27.00 to 28.00
Eastern Pennsylvania	nominal
New York (dealers)	20.00 to 21.00
St. Louis	29.00 to 29.50

IRON RAILS

Buffalo	$23.00 to 23.50
Chicago	23.00 to 23.50
Cincinnati	16.00 to 16.50
St. Louis	20.00 to 20.50

PIPES AND FLUES

Chicago	13.50 to 14.00
Cincinnati	12.50 to 13.00
Cleveland	12.50 to 13.00
St. Louis	14.00 to 14.50

RAILROAD GRATE BARS

Buffalo	18.00 to 19.00
Chicago	17.00 to 17.50
Cleveland	17.00 to 17.50
Eastern Pennsylvania	18.00 to 19.00
New York (dealers)	14.50 to 15.00
St. Louis	18.00 to 18.50

FORGE FLASHINGS

Boston (dealers)	13.00 to 13.50
Chicago, small	13.00 to 13.50
Cleveland, small	17.00 to 17.50
Cleveland, large	17.00 to 17.50
Detroit (dealers)	14.00 to 15.00

FORGE SCRAP

Boston (dealers)	12.75 to 13.00
Chicago	18.50 to 19.00
Eastern Pennsylvania	17.50 to 18.50

ARCH BARS AND TRANSOMS

Chicago	26.50 to 27.00
St. Louis	26.00 to 26.50

ANGLE BARS—IRON

Chicago	26.00 to 26.50
St. Louis	25.50 to 26.00

Iron and Steel Works Scrap

AXLE TURNINGS

Boston (dealers)	14.50 to 15.00
Buffalo	22.50 to 23.00
Chicago	17.50 to 18.00
Cleveland	17.25 to 17.50
Eastern Pennsylvania	19.00 to 20.00
Pittsburgh	19.50 to 20.00
St. Louis	14.50 to 15.00

STEEL CAR AXLES

Birmingham	24.00 to 25.00
Boston (consumers)	24.00 to 25.00
Buffalo	24.50 to 25.00
Chicago	24.00 to 24.50
Cleveland	26.00 to 27.00
Eastern Pennsylvania	nominal
New York (dealers)	nominal
Pittsburgh	25.00 to 25.50
St. Louis	24.00 to 24.50

SHAFTING

Boston (consumers)	24.50 to 25.00
Chicago	25.00 to 25.50
Eastern Pennsylvania	24.00 to 26.00
New York (dealers)	21.50 to 22.00
St. Louis	24.00 to 24.50

Iron Foundry Scrap

CAR WHEELS

Birmingham, tram car	23.50 to 24.00
Birmingham, iron	22.00 to 23.00
Boston (consumers)	23.50 to 24.00
Buffalo, iron	21.00 to 22.00
Chicago, iron	22.50 to 23.00
Cincinnati	17.50 to 18.00
Eastern Pennsylvania	23.00 to 25.00
New York iron (dealers)	22.50 to 23.50
Pittsburgh, iron	22.00 to 22.50
Pittsburgh, steel	23.50 to 24.00
St. Louis, iron	21.00 to 21.50

NO. 1 CAST SCRAP

Birmingham, cupola	24.00 to 25.00
Boston (consumers)	24.75 to 25.25
Buffalo	23.00 to 24.00
Chicago, cupola	23.00 to 23.50
Cincinnati No 1. machinery, cupola (net tons)	23.00 to 23.50
Cleveland, cupola	23.50 to 24.00
Detroit (net ton) (dealers)	23.00 to 24.00
Eastern Pennsylvania, cupola	23.00 to 24.00
New York, cupola (dealers)	20.00 to 21.00
Pittsburgh, cupola	24.00 to 24.50
San Francisco	26.00 to 28.00
St. Louis, railroad	23.00 to 23.50
St. Louis, agricultural	21.50 to 22.00
Valleys	24.00 to 25.00

HEAVY CAST

Boston (consumers)	21.00 to 22.00
Buffalo	18.00 to 19.00
Cleveland	19.00 to 19.50
Cast out (automobile (net ton)	25.00 to 26.00
Eastern Pennsylvania	19.00 to 19.50
New York (dealers)	18.00 to 19.00
Pittsburgh	19.50 to 20.00

MALLEABLE

Boston (railroad) (consumers)	24.00 to 25.00
Buffalo	24.00 to 25.00
Chicago, railroad	25.00 to 25.50
Chicago, agricultural	23.50 to 24.00
Cincinnati, agricultural	18.50 to 19.50
Cincinnati, railroad	20.00 to 20.50
Cleveland, agricultural	24.00 to 25.00
Cleveland, railroad, nominal	25.00 to 25.50
Detroit (dealers)	22.00 to 23.00
Eastern Pennsylvania, railroad	22.00 to 23.00
Pittsburgh, railroad	24.00 to 24.50
St. Louis, agricultural	20.50 to 21.00
St. Louis, railroad	21.50 to 22.00

Miscellaneous Scrap

RAILS FOR ROLLING
5 feet and over

Birmingham	20.00 to 21.00
Boston (dealers)	17.00 to 17.50
Chicago	20.00 to 20.50
Cleveland	21.50 to 22.00
Detroit	16.00 to 16.50
Eastern Pennsylvania	21.00 to 22.00
New York (dealers)	20.00 to 20.50
Pittsburgh district	22.00 to 22.50
St. Louis	20.00 to 20.50

LOCOMOTIVE TIRES

Chicago	20.25 to 20.75
St. Louis	19.00 to 19.50

LOW PHOSPHORUS PUNCHINGS

Chicago	20.50 to 21.00
Eastern Pennsylvania	26.00 to 28.00
Pittsburgh	24.50 to 25.00

Aachener Post

Westdeutsches Nachrichtenblatt für Politik und Wirtschaftsleben

Beilagen: Das Reich der Frau / Sport der Westmark / Unterhaltungsbeilage

33. Jahrgang / Nummer 37 Dienstag, 20. Februar 1923

Aachener Post is one of the most important daily newspapers published in Aix-la-Chapelle, or Aachen as the Germans call it, an important manufacturing town lying on the German-Belgian border.

400 Newspapers Regularly Quote

IRON TRADE REVIEW

CLEVELAND

The international reputation and the World-Wide circulation of the IRON TRADE REVIEW is the result of year after year of unfailing Editorial accuracy and reliability.

PROOF—

THE IRON TRADE REVIEW

"The Most Widely Quoted Trade Paper In The World"

European Iron and Steel Statistics

Gross Tons

Pig Iron Production

	United Kingdom	France	Belgium	Luxemburg
Monthly average 1912.	729,000	405,000	192,000	184,800
Monthly average 1913.	855,000	427,000	203,800	209,000
Monthly average 1919.	617,000	198,000	20,600	50,000
Monthly average 1920.	669,500	281,700	92,700	58,000
Monthly average 1921.	217,600	280,300	71,800	79,600
Monthly average 1922.	403,300	428,900	131,500	137,500
1922				
January	288,000	307,000	92,700	99,900
February	300,100	318,000	90,300	95,200
March	389,800	370,000	116,500	130,900
April	394,300	377,300	112,000	128,800
May	407,900	435,300	117,100	139,300
June	369,200	409,300	113,100	141,500
July	399,100	421,400	125,200	147,800
August	411,700	440,400	151,500	147,800
September	430,300	454,600	160,600	149,400
October	481,500	495,600	172,000	162,600
November	493,900	505,500	169,600	151,300
December	533,700	506,200	157,900	156,700
1923				
January	567,900	478,600	157,800	139,500
February	543,400	300,800	149,000	86,500
March	633,600	311,200	167,300	93,900

Ingots and Castings Production

	United Kingdom	France	Belgium	Luxemburg
Monthly average 1912.	566,000	363,000	206,000	79,400
Monthly average 1913.	639,000	385,000	202,300	109,000
Monthly average 1919.	658,000	179,000	27,400	32,000
Monthly average 1920.	755,600	250,200	101,300	49,000
Monthly average 1921.	302,100	254,500	65,000	62,300
Monthly average 1922.	486,000	372,000	128,200	114,000
1922				
January	327,500	309,000	78,400	75,600
February	418,800	311,800	82,700	75,100
March	549,400	361,200	104,000	99,200
April	404,200	319,300	95,200	98,100
May	462,300	358,100	116,500	112,200
June	400,200	352,500	111,300	121,600
July	473,100	362,900	112,500	125,600
August	528,400	390,300	149,100	129,200
September	555,900	400,300	154,900	132,600
October	565,201	423,000	179,600	136,800
November	600,800	404,100	174,600	130,200
December	546,100	408,100	166,700	131,600
1923				
January	634,100	401,400	159,800	121,500
February	707,100	285,300	154,700	72,400
March	802,500	310,900	181,100	78,500

Imports

	United Kingdom	France	Belgium	Germany
Average monthly 1912.	166,400	16,400	87,000	27,300
Average monthly 1913.	185,900	12,900	68,900	25,000
Average monthly 1919.	42,400	113,100	44,400	.....
Average monthly 1920.	92,400	89,000	67,000	26,200
Average monthly 1921.	137,100	38,500	43,300	.....
Average monthly 1922.	73,500	64,300	42,000	199,000
1922				
January	88,700	36,600	139,000	68,200
February	64,600	55,800		66,900
March	63,800	67,300		105,700
April	59,900	89,100	32,400	129,000
May	60,900	41,100	62,400	154,300
June	52,800	73,200		137,700
July	55,900	54,800		182,900
August	80,100	40,300	129,700	181,800
September	70,600	50,000		175,000
October	90,600	109,200		233,800
November	79,800	58,500	140,000	186,700
December	114,000	109,500		155,900
1923				
January	128,900	55,800	.....	191,000
February	122,700	63,800	.....	.....
March	111,000	.....	.....	.....

Exports

	United Kingdom	France	Belgium	Germany
Average monthly 1912.	400,600	41,500	124,500	482,400
Average monthly 1913.	414,100	48,200	128,800	516,900
Average monthly 1919.	186,100	19,400	14,500	.....
Average monthly 1920.	270,900	74,600	74,300	143,600
Average monthly 1921.	141,700	132,700	75,900	176,000
Average monthly 1922.	283,400	164,000	143,000	209,700
1922				
January	235,300	164,000	198,400	218,200
February	223,400	107,000		170,000
March	295,800	72,300		208,700
April	258,400	125,800	83,900	195,500
May	272,400	122,200	279,600	204,500
June	236,300	180,300		209,132
July	251,700	182,100		206,200
August	270,000	168,400	522,600	181,300
September	279,200	174,000		223,500
October	347,100	235,600	631,200	229,908
November	372,300	181,300		210,000
December	114,000	221,700		258,900
1923				
January	353,400	158,500	.....	209,000
February	317,600	236,500	.....	.....
March	368,100	.....	.....	.....

Note—Belgian figures include Luxemburg since June 1, 1922.

*Provisional estimate., Export and import figures do not include scrap.

American Iron and Steel Exports and Imports

Gross Tons

	Imports	Exports
1923		
April	.....	183,905
March	106,050	168,176
February	67,682	135,046
January	119,955	134,441
1922		
December	96,358	154,087
November	152,250	124,004
October	184,202	131,542
September	76,393	128,370
August	49,054	144,264
July	62,426	157,027
June	39,154	216,298
May	23,098	229,616
April	18,720	197,562
March	12,774	206,474
February	11,535	133,333
January	13,404	155,962
Total	643,010	1,988,539
1921		
December	9,400	134,348
November	9,296	125,492
October	10,609	106,466
September	11,743	94,650
August	8,069	75,641
July	10,040	85,520
June	8,260	119,021
May	10,915	140,987
April	4,847	160,921
March	14,492	210,451
February	3,650	387,900
January	15,784	516,447
Total	117,105	2,156,818
1920		
December	15,120	499,780
November	50,995	434,290
October	39,297	451,972
September	31,825	408,605
August	58,335	431,519
July	32,742	419,230
June	40,549	392,780
May	29,125	419,064
April	29,681	395,583
March	38,377	426,448
February	36,491	308,128
January	45,796	333,514
Total	448,833	4,920,913
1919		
1919	327,490	4,405,281
1918	168,225	5,372,424
1917	324,565	6,442,240
1916	310,891	5,947,646
1915	282,396	3,532,564
1914	289,775	1,549,554
1913	317,260	2,745,635
1912	225,072	2,947,596
1911	262,457	2,187,725
1910	510,730	1,537,943
1909	363,984	1,243,583
1908	205,845	964,242
1907	662,358	1,301,981
1906	577,809	1,325,740
1905	416,000	1,010,255
1904	266,398	1,167,674
1903	1,178,797	326,590
1902	1,212,484	411,915
1901	221,297	81,211
1900	209,955	286,687